

Mississippi University for Women

ATHENA COMMONS

MSN Research Projects

MSN Research

8-1-2001

Adherence To Jnc Vi Guidelines For Hypertension Management By Primary Care Nurse Practitioners

Gregory N. Cagle

Mississippi University for Women

Follow this and additional works at: <https://athenacommons.muw.edu/msn-projects>



Part of the [Nursing Commons](#)

Recommended Citation

Cagle, Gregory N., "Adherence To Jnc Vi Guidelines For Hypertension Management By Primary Care Nurse Practitioners" (2001). *MSN Research Projects*. 163.

<https://athenacommons.muw.edu/msn-projects/163>

This Thesis is brought to you for free and open access by the MSN Research at ATHENA COMMONS. It has been accepted for inclusion in MSN Research Projects by an authorized administrator of ATHENA COMMONS. For more information, please contact acpowers@muw.edu.

ADHERENCE TO JNC VI GUIDELINES FOR
HYPERTENSION MANAGEMENT BY PRIMARY
CARE NURSE PRACTITIONERS

by

GREGORY N. CAGLE

A Thesis
Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Nursing
in the Division of Nursing
Mississippi University for Women

COLUMBUS, MISSISSIPPI

August 2001

ProQuest Number: 27924618

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent on the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 27924618

Published by ProQuest LLC (2020). Copyright of the Dissertation is held by the Author.

All Rights Reserved.

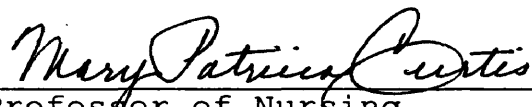
This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

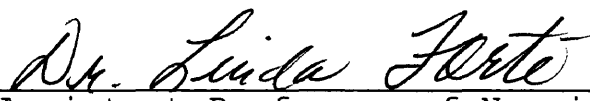
Adherence to JNC VI Guidelines for
Hypertension Management by Primary
Care Nurse Practitioners

by

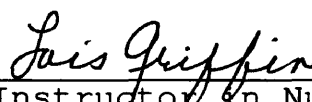
Gregory N. Cagle



Professor of Nursing
Director of Thesis



Assistant Professor of Nursing
Member of Committee



Instructor in Nursing
Member of Committee



Director of the Graduate School

Abstract

Although improvement in the detection and treatment of hypertension has occurred over the last two decades, the trends have stagnated over the last 5 years with a related increase in mortality from cardiac failure and an increased incidence of end-stage renal disease. Current researchers have made a strong argument that many health care providers have not been successfully managing hypertension at a level, as established by research, to prevent target organ disease over time. As health care providers, family nurse practitioners (FNPs) and adult nurse practitioners (ANPs) are managing hypertension in outpatient settings as primary care nurse practitioners (PCNPs). This descriptive study sought to answer two research questions: How effectively are PCNPs implementing the JNC VI guidelines for hypertension management in practice? And are PCNPs aware of the current national guidelines (JNC VI) for hypertension management? Ten critical factors/interventions were measured to evaluate compliance with the JNC VI guidelines and were analyzed with descriptive statistics of frequency. Data

analysis revealed that the PCNPs in the study were noncompliant with the use of the JNC VI guidelines in practice and encouraged recommendations in PCNP education and practice for the future.

Table of Contents

	Page
Abstract	iii
List of Tables	vii
 Chapter	
I. The Research Problem	1
Establishment of the Problem	3
Significance to Nursing	10
Theoretical Framework	12
Assumptions	14
Statement of the Problem	15
Research Questions	16
Definition of Terms	16
II. Review of the Literature	18
III. The Method	55
Design of the Study	55
Setting, Population, and Sample	56
Setting	56
Population	56
Sample	57
Instrumentation	57
Methods of Data Collection	64
Data Analysis	66
IV. The Findings	69
Description of the Sample	70
Results of Data Analysis	70
V. The Outcomes	78
Discussion	80
Limitations	87
Significance to Nursing	88

Conclusions	89
Recommendations	90
References	92
Appendix	
A. Cagle's JNC VI Guidelines Compliance Survey	96
B. Approval of Mississippi University for Women's Committee on Use of Human Subjects in Experimentation	101
C. Letters to Participants	103
D. Second Consent Letter and Request for Participation	105
E. JNC VI Awareness Questionnaire/Postcard	108

List of Figures

Table	Page
1. Distribution of scores	71
2. Clinical sites--hospital	72
3. Clinical sites--private practice	73
4. Clinical setting--all other settings	73
5. Case study #1	75
6. Case study #2	75
7. Case study #3	76
8. Prescriptive compliance with JNC guidelines	77

Chapter I

The Research Problem

Cardiovascular disease has been cited by health care professionals as the main health problem facing the United States. Heart disease has been established as the number one cause of mortality in the United States with 724,859 deaths in 1998 (National Center for Health Statistics, 1998). Over the last 30 years researchers have concluded that hypertension is a strong predictor of future cardiovascular disease and other target organ disease when uncontrolled (Belanger, Cupples, & D'Agostino, 1988; He & Whelton, 1999; Kennel, 1999). This recognition of hypertension as a related cause of cardiovascular disease and other target organ diseases has led many developed nations to formulate national programs and guidelines for hypertension control.

The United States' version of a national hypertension control program was started in 1973 with the National Heart, Lung, and Blood Institute (NHLBI) establishing the National High Blood Pressure Education Program (NHLBI, 1997). The NHLBI formed a committee of professionals from

various professional and governmental health care agencies to meet needs of inadequate detection and treatment of hypertension in the United States. The last committee appointed, the Sixth Joint National Committee for the Prediction, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI), met and created the most recent national guidelines for hypertension management in 1997. Over the last 27 years, health care providers implementing NHLBI guidelines have reduced the mortality rates for stroke and coronary heart disease significantly and increased the awareness and treatment of hypertension nationwide (NHLBI, 1997).

Although multiple and various methods of research, including controlled trials, were used in formulating these guidelines for hypertension management, many health care professionals are not complying with the guidelines in practice as revealed by current literature and statistics. This perplexing problem has a direct effect on the care provided to patients and motivated the current study to ascertain how primary care nurse practitioners (PCNPs) are managing their health problem. PCNPs treat and manage medical illnesses using standardized guidelines for practice in a medica/curing model. PCNPs also practice from a nursing/caring model that is influenced by nursing experience and education prior to specialized education in

the PCNP role. This researcher explored the role of PCNPs as a separate population from physicians to determine how they approached hypertension management, especially in regard to compliance with national hypertension guidelines.

Establishment of the Problem

Hypertension management in the United States has been a concern of almost all health care providers because of the strong causal and predictive relationship to cardiovascular disease, cerebrovascular disease, end-stage renal disease, peripheral vascular disease, and other target organ disease (Belanger et al., 1988; He & Whelton, 1999; Kennel, 1999; Stamler, Stamler, & Neaton, 1993). Due to this recognition of hypertension as a causative factor for significant amount of mortality and morbidity worldwide, most developed countries have endorsed national hypertension control programs. In the United States, the NHLBI has appointed a joint national committee every 5 years since 1973 to study and update national guidelines for health care professionals to use for hypertension management. The JNC VI revealed some alarming trends over the last 5 years that suggest the need for improvement in hypertension management strategies by health care providers (NHLBI, 1997). The areas of greatest concern

were an increase in the incidence of mortality from cardiac failure, an upsurge in the incidence of end-stage renal disease (ESRD), and a slight statistical rise in the incidence of age-adjusted stroke rates (NHLBI, 1997). The JNC VI determined that hypertension is "the second most common antecedent" in ESRD and a "common antecedent" in heart failure (NHLBI, 1997, p. 5).

Cardiovascular disease and stroke are very costly in health care dollars spent in the care for these diseases. The JNC VI reported that cardiovascular disease costs "impose an enormous financial burden on Americans [with] more than \$259 billion in direct and indirect cost [yearly]" (NHLBI, 1997, p. 7). Current researchers believe that part of this problem is related to failure to follow established hypertension management guidelines and personal clinical practice beliefs of health care providers in current practice that are not established through research (Dustan, 1998; Perry et al., 1998; Swales, 1999). Although the JNC VI has recommended that health care providers control their patients' blood pressure at a level of $\leq 140/90$ mmHg to prevent target organ disease and optimally $\leq 120/80$ mmHg, current researchers argue that this is not being done effectively (Berlowitz et al., 1998; Dustan, 1998; Perry et al., 1998; Swales, 1999).

Health care providers are overlooking systolic hypertension, especially in the elderly, due to beliefs that it is too variable to be a predictor of cardiovascular disease (Berlowitz et al., 1998; Dustan, 1998; Swales, 1999). One study, Current Clinical Practice in Hypertension: The EISBERG project (Swales, 1999), exemplified the current inadequate hypertension control. The EISBERG project made a strong argument that systolic hypertension is not being controlled effectively in the United States and in six other developed countries. This project used a quantitative analysis of data received from seven countries, 1,486 general practitioners, and 17,359 patients to discover some unsettling findings. Only 49% of patients in the study were controlled at a blood pressure $\leq 160/90$ mmHg and only 30% to the level of $\leq 140/90$ mmHg as established by the JNC VI and other countries' hypertension guidelines. This example of ineffective systolic hypertension was consistent with the statement by the JNC VI, "nearly three-fourths of adult Americans with hypertension are not controlling their blood pressure to below 140/90 mmHg" (NHLBI, 1997, p. 8). Similarly, statistics reported by the Third National Health and Nutritional Survey show that "69% of hypertensive subjects were aware of [their] elevated blood pressure, 53% were

receiving treatment, and 24% were controlled" (Swales, 1999, p. 232).

The EISBERG project results also imply that systolic blood pressures have not been as rigidly controlled as diastolic blood pressures. The authors reported that more than 50% of the sample patients had a diastolic blood pressure controlled to a level endorsed by their country's national guidelines, but less than 40% of the patients had a systolic blood pressure controlled at this level. Swales (1999) concluded that part of this mismanagement of systolic blood pressure was due to some physicians having "a skeptical [belief] about the significance of systolic blood pressure . . . it was too variable to be a reliable predictor of cardiovascular risk [and] diastolic blood pressure is more readily controlled" (p. 234). This opinion was generated following the analysis of the qualitative data on hypertension management beliefs received during the study which included opinions of 30 general practitioners.

Other results in the EISBERG project implied that a patient's age affected hypertension control. For example, the general practitioners who were interviewed treated patients older than 65 years less aggressively, as the majority did not institute pharmacological treatment until blood pressure was 170/100 mmHg (Swales, 1999). The

EISBERG project, along with an advisory statement from the NHLBI (Izzo, Levy, & Black, 2000), highlighted a belief by some physicians that an elderly person's age plus 100 mmHg was an appropriate blood pressure. These beliefs and treatment practices are not congruent with the JNC VI guidelines or recent research findings which stated that systolic hypertension is a strong predictor of cardiovascular disease and should not be overlooked as a natural part of aging as blood vessels lose their elasticity (Belanger et al., 1988; He & Whelton, 1999; Kennel, 1999; Staessen et al., 2000; Stamler et al., 1993). Izzo and his colleagues reviewed results from the Lloyd-Jones (1999) study which used data from the Framington Heart Study cohort to measure systolic hypertension's ability to predict need for pharmacologic treatment. Izzo et al. stated that "systolic blood pressure alone correctly classified blood pressure stage in 91 percent of individuals who were potential candidates for antihypertensive therapy compared to 22 percent who were correctly classified using diastolic blood pressure values" (Izzo et al., 2000, p. 2).

Uncontrolled systolic hypertension is a strong predictor of a stroke and is a prevalent cause of mortality nationwide (He & Whelton, 1999; Kennel, 1999; Staessen et al., 2000; Stamler et al., 1993). The National

Center of Health Statistics (NCHS) report that stroke is the third cause of death in the United States. However, Mississippi, the main setting for this study, has an 18% higher stroke rate than the national average as reported by the American Heart Association (Penman & Johnson, 2000). Another alarming statistic for the state of Mississippi concerning mortality related to strokes was that one fourth of the stroke-related deaths were in patients less than 65 years of age (Penman & Johnson, 2000). The detection and treatment of hypertension have been a problem in Mississippi. Approximately one third of the state's population has hypertension, and one third of those citizens with hypertension have not been diagnosed (Penman & Johnson, 2000). Of those diagnosed, "half are not on treatment, for one reason or another" (Penman & Johnson, 2000, p. 9). The problems with detection of hypertension may be attributed to a lack of access to a provider in many outlying rural areas in Mississippi.

Family nurse practitioners (FNPs) and adult nurse practitioners (ANPs) are primary care providers that work in rural areas to meet the health needs of these underserved populations. These PCNPs are educated to detect and treat hypertension as part of their advanced practice role. PCNPs use scientifically supported medical research to guide their practice. PCNPs also are educated

to use guidelines for practice with various disease processes. PCNPs in this respect follow a medical/curing model when approaching patient care.

On the other hand, PCNPs are registered nurses who have received education as advanced practice nurses to approach patients from a nursing/caring model. This is important as the nursing/caring model stresses the importance of health teaching and promotion with close contact with the patient. Although recent research has sought to determine the degree of satisfaction related to performance of care between physicians and nurse practitioners (NPs) by patients, no research was found that studied PCNPs as a separate population in regard to their compliance with medical guidelines in practice. This current researcher sought to add to the scientific foundation of nursing by evaluating PCNPs' ability to use the JNC VI guidelines in practice. Implementation of this descriptive research was important to evaluate the care for patients with hypertension across the adult life span. Analysis of the research data can be used to formulate future educational and practice evaluation guidelines for PCNPs.

Significance to Nursing

Although improvements concerning nurse practitioner professional practice issues have been addressed through state and national legislation, some physicians are still fighting NPs at every turn regarding their professional scope of practice. A recent legislative update concerning NP practice issues stated, "The AMA has an intensive online advocacy campaign to help medical societies defeat state and national legislation that improves practice authority of APN and other providers . . . as part of the AMA's plan to sustain physician control over other providers" (Pearson, 2001, p. 14). The AMA, according to the author of the update,

. . . submitted a "Citizens Petition" to the HCFA in July 2000 [which] . . . insists that NPs and CNSs should be forced to work in collaboration with physicians, [that] HCFA has failed to uphold the intent of Congress and its duty to taxpayers and medical beneficiaries by encouraging APNs to practice beyond legally authorized safeguards. (Pearson, 2001, p. 14)

Although recent studies have supported the NP's ability to competently care for patients while being economically conscientious, NPs still face many professional practice issues, such as (a) direct reimbursement, (b) prescriptive authority restrictions, (c) hospital privilege restrictions, and (d) limited scope of practice concerning medical procedures (Pearson, 2001).

One main issue affecting many NPs is legislation controlling prescriptive authority. Currently, the majority of states (N = 38) in the United States require NPs to have physician's involvement, with prescriptions written with their name on the prescription pad or delegation by physicians concerning medications that can be prescribed in practice (Pearson, 2001). Although many studies have been performed concerning NPs' ability to care for patients in various medical settings with diverse medical populations, some controversy remains regarding NPs receiving enough pharmacological education to be competent in prescriptive practice. A review of the literature concerning NPs' prescriptive competence yielded no results on different pharmacologic classes of medication. Further outcome research concerning competent prescriptive practice of various pharmacologic classes of medication is needed to push future legislation to respect the NP's ability to competently prescribe all classes of medication without physician supervision or delegation. This research aims to add scientifically relevant data to help fill this gap in outcome-based, nurse practitioner, prescriptive practices by focusing on how NPs follow national guidelines in treating hypertension (HTN) with antihypertensive medications along with other nonpharmacologic measures. Results from studies on NP

prescription practice along with future outcome oriented research concerning NP treatment methods should allay fears by the health care consumer, give confidence to legislators involved in NP professional practice issues, and subdue doubt and argumentation of the aforementioned health care providers.

Theoretical Framework

Imogene King's Theory of Goal Attainment was the theoretical framework used to guide the study. In King's Theory of Goal Attainment, a dyad, or group of two people, come together to form an interpersonal system. This interpersonal system relies on communication to provide interaction between the two people in the dyad (King, 1981). The PCNP and the patient with hypertension exemplify the dyad in this study. King explained in her theory that interaction allows the nurse to develop a model of transaction/interaction that shares theoretical knowledge used by nurses to help individuals and groups achieve their goals (King, 1981). Mutual goals toward health are formed and agreed upon by the nurse and patient and include the following steps: "(a) nurses' assessment of a client's concerns, problems, and disturbances in health; (b) [the] nurse's and client's perception of the interference; [and] (c) their sharing of information

whereby each functions to help the client attain the goals identified" (King, 1995, p. 28).

Transaction is explained as a process in which both the nurse and the client perform actions together to meet a goal they have agreed upon. This process depends on the nurse, or in the current study, the PCNP, to "communicate appropriate information to clients" (Tomey & Alligood, 1998, p. 306) to allow mutual goal setting and attainment to occur. The PCNP must be knowledgeable about current modalities of treatment and management of disease process to be effective in this process. Hypertension management can be controlled by both lifestyle modification and pharmacological treatment. The PCNP should be aware of the most current, effective treatment interventions in regard to hypertension management to efficiently formulate competent treatment regimens for hypertensive patients.

There also is a need for mutual goal setting between the PCNP and the patient in this process to ensure patient compliance with a treatment regimen. Antihypertensive medications have various side effects that are worrisome to patients and cause these patients to alter the prescribed antihypertension medication regimen. Some hypertensive patients are not aware of arteriosclerosis and hyperlipidemia, along with other lifestyle factors as scientific evidence of hypertension. PCNPs should

constantly interact with these patients and determine their perception of treatment interventions in an effort to formulate goals toward hypertension management and ensure compliance. King states in her theory, "if perceptual accuracy is present in nurse-client interactions, transactions will occur, [and] if nurse and client make transactions, goals will be obtained" (Tomey & Alligood, 1998, p. 306).

Assumptions

The following assumptions were made in formulating the design and are regarded as principles that are believed to be true and relevant to the current research:

1. PCNPs value established research on medical and nursing treatments as the foundation for competent practice.
2. The JNC VI guidelines for hypertension management are valid for the management of hypertension and are adequately backed by scientific research.
3. PCNPs have the proper education and clinical preparation to effectively predict, detect, evaluate, and treat hypertension.
4. PCNPs can be effective in the management of disease process in patients through use of mutual goal

setting by sharing specialized knowledge contained in guidelines for medical practice.

Statement of the Problem

Hypertension detection and treatment have improved over the last two decades, but the trends have stagnated over the last 5 years with an increase in the incidence of mortality from cardiac failure and an increased incidence of end-stage renal disease (NHLBI, 1997). This dilemma is largely due to mismanagement of systolic blood pressure at parameters > 140 mmHg despite valid research that systolic blood pressure is a strong predictor of future cardiovascular and renal disease. Many health care providers still hold beliefs that systolic blood pressure is too variable to be an adequate predictor of future cardiovascular disease (CVD). These health beliefs are not supported by scientific research and are inconsistent with national guidelines that support a blood pressure measurement of $\leq 140/90$ mmHg, especially in elder clients to prevent further target organ disease (NHLBI, 1997).

PCNPs may not be managing high blood pressure by using national guidelines despite adequate research which asserts that high blood pressure maintained at a level $\geq 140/90$ mmHg puts patients at risk for target organ disease. This researcher explored how compliant PCNPs were

in using the scientifically backed JNC VI recommendations for hypertension management.

Research Questions

For this study, the following research questions were formulated:

1. How effectively are PCNPs implementing the JNC VI guidelines for hypertension management in practice?

2. Are PCNPs aware of the current national guidelines (JNC VI) for hypertension management?

Definition of Terms

The following concepts, essential to the study, were defined to help the reader better comprehend their meaning. The theoretical definition is the definition of the concept as it relates to the literature reviewed for the study. The conceptual definition is the operational definition or how the concept is used in the study.

Primary care nurse practitioner (PCNP): Theoretical: a licensed, certified, advanced practice nurse, who acts as a primary care provider and provides medical care to patients of various ages within a family. Conceptual: family nurse practitioner or adult nurse practitioner, certified and licensed in the state of Mississippi, performing the role of a primary care provider, who has at

least 1 year of experience and practices in Mississippi, Alabama, Tennessee, or Louisiana.

Hypertension management: Theoretical: maintenance of a blood pressure measurement within the prescribed JNC VI parameter to prevent the onset, or progression, of target organ disease in a patient medically diagnosed with or in treatment for hypertension. Conceptual: the maintenance of a blood pressure measurement $\leq 140/90$ mmHg without organ disease and a blood pressure measurement of $\leq 130/80$ mmHg with target organ disease in a patient, 35 to 55 years of age, to prevent onset or progression of target organ disease.

JNC VI guidelines. Theoretical: " . . . national guidelines formulated by the National High Blood Pressure Education Program of the National Heart, Lung, and Blood Institute to predict, detect, evaluate, and treat hypertension" (NHLBI, 1997, p. 5). Conceptual: national guidelines formulated by the National High Blood Pressure Education Program of the National Heart, Lung, and Blood Institute to predict, detect, evaluate, and treat hypertension. PCNPs' compliance with, and awareness of, the national hypertension management guidelines (JNC VI) were measured using 10 critical factors identified on Cagle's JNC VI Guidelines Compliance Survey.

Chapter II

Review of the Literature

A review of the literature was performed to validate and establish a need for this study on PCNPs and hypertension guidelines compliance. Very limited research was found to support the concepts, and only one set of researchers discussed nurse practitioners (NPs) in hypertension management using national hypertension guidelines. The limited amount of research found was in itself an indication of the need for research, and the literature found did make a sound argument for this study and is made evident by findings reviewed in the studies that follow.

Goldberg et al. (1998) directed their research to evaluate how effective continuous quality improvement (CQI) teams and academic detailing (AD) were in producing change in clinical practice concerning hypertension (HTN) and depression. The research problem as identified by the authors was, although clinical guidelines for practice have been developed and disseminated over the last two decades, compliance by health care providers has been very

minimal (Goldberg et al., 1998). AD and CQI have been successful methods for altering practice in medication prescription practice and industrial management, but have not been studied in regard to chronic disease and treatment (Goldberg et al., 1998). Thus, the researchers listed three research questions:

1. How well were the AD techniques and CQI team interventions implemented within clinics?
2. How effective were both interventions in increasing compliance with guideline recommendations across clinics?
3. If variation in implementation was observed, were instructive associations between implementation success and outcome improvement demonstrated?

Academic detailing was defined as "one-on-one education and feedback sessions" (Goldberg et al., 1998, p. 130) provided by experts concerning guidelines for clinical management of HTN and depression, and CQI teams as "a model in which entire organizations commit to reducing unwanted practice variation at all levels" (Goldberg et al., 1998, p. 131). Blood pressure control was defined as a blood pressure measurement $< 160/90$ mmHg, and a diastolic blood pressure measurement < 80 mmHg was described as over-controlled (Goldberg et al., 1998).

The study design used was a descriptive, pretest-posttest experimental design which gathered baseline data for 12 months, followed by 6 months of intervention with AD, CQI, or both, and then re-gathered data for 12 months post-interventions. Four clinical sites in the Seattle, Washington, area provided the settings. Two of the clinics were HMO affiliated, one was a university-based hospital and the last site was a veterans clinic.

A blocked and randomized sampling design was utilized and consisted of 15 small groups of health care practitioners including 95 health care providers and 4,955 patients in total. The patients were by majority Caucasian (> 84%) and male (> 51.4%). The majority of physicians (> 74%) represented were internal medicine practitioners as a speciality. The patients used in the HTN portion of the study were "known hypertensives" and described as "patient with a mean blood pressure value \geq 160/90" (Goldberg et al., 1998, p. 133). Differences between samples were compared through the use of analysis of variance and contingency table analysis, as data were received from self-administered questionnaires and surveys (Goldberg et al., 1998). There was a control group for the study which received usual care (UC) during the study to compare the results.

The AD intervention was performed by two physicians at each site giving 15-minute lectures on information from guidelines for hypertension, followed by two follow-up sessions conducted by pharmacists concerning prescription patterns.

The CQI teams were implemented by CQI facilitators for the first couple of months of the study and then supervised by physician team leaders. The CQI facilitator trained physician team leaders in "team based approaches . . . to improve quality" and informed team on change process by facilitating the "Shewart cycle of activities . . . [to] plan, do, study, act" (Goldberg et al., 1998, p. 132). Each team collected its own data at its own pace and was free to choose interventions to change processes as problems presented themselves during the data collection. The only limitation was that interventions had to be geared toward the five recommendations formulated for HTN and depression.

The recommendations related to hypertension were (a) the prescribing of beta-blockers and potassium-sparing diuretics specifically promoted, (b) the prescribing of calcium channel blockers and ACE inhibitors were "to be reserved for special indications or when first-line drugs have proven ineffective," and (c) blood pressure control to be performed without placing patients at risk for

"over-control" (Goldberg et al., 1998, p. 132). There were three to five groups at each site participating in the study receiving either AD, CQI, both, or UC. The instruments for data collection were varied from information systems in pharmacy to collect prescription patterns to written charts in the hypertension portion of the study.

Data were analyzed using mean percentages for all clinics and highest percentage change as "best case clinic" to reflect changes following interventions and compared to usual care (UC). Differences between samples were compared through the use of analysis of variance and contingency table analysis, as data was received from self-administered questionnaires and surveys. Pairwise t tests were used to distinguish changes of one intervention in comparison with the others and usual care. The samples were designed to give a good degree of power (80%) in revealing a 10% change as HTN control (Goldberg et al., 1998).

There were only two significant findings ($p < .05$). In the county, Harborview Medical Center, AD + CQI were statistically significant ($p = .01$) in producing an increased change in the prescription of diuretics as compared to UC. The other significant finding ($p = .00$) was in regard to AD + CQI teams versus AD in increasing

the percentage of diuretic prescription in the same setting. There was less than a 3.8% mean increase in prescription patterns of diuretics, potassium-sparing regimens, and beta-blockers in groups where AD, or AD and CQI, interventions were implemented. Ironically there was a higher percentage change in usual care patterns, with the highest percentage improvement (+6.3% mean) for all clinics in potassium-sparing regimens. There was only slight improvement in beta-blocker prescribing (+3.7% mean) in AD + CQI groups versus usual care (+3.1% mean) (Goldberg et al., 1998). The decrease percentage in the prescription of calcium channel blockers (-1.3% mean) and ACE inhibitors (+1.3% mean) was also very poor as compared to usual care changes for calcium channel blocks (-4.6% mean) and ACE inhibitors (+2.1% mean). The analysis of blood pressure control improvement means were also dismal, with only an 8.2% increase in control for AD groups and a 3.9% increase in AD + CQI groups compared to a 9.6% improvement in the usual care group. There was an increase in over control of blood pressure, as defined by the study, in all groups with a 3.1% increase in AD groups, a 7.8% increase in the AD + CQI groups, and a 10.6% increase in the UC group (Goldberg et al., 1998).

The researchers concluded, "neither the AD nor the CQI team interventions . . . were associated with

improvement in prescribing patterns or control rates in regard to guideline recommendations across clinics" (Goldberg et al., 1998, p. 132). This conclusion illustrates that although reliable scientific research has been established to improve treatment clinical practitioners have failed to alter their management. Although AD and the CQI techniques were performed adequately in the setting there was a high degree of freedom given to each setting concerning choices for "process change and in identifying process deficiencies" (Goldberg et al., 1998, p. 132). Due to this freedom, it is possible that the AD and CQI methods may have been performed differently in these settings and had an effect on findings, but the homogeneity of results being nonsignificant suggests that this was not the case.

The authors concluded that implementation of the AD or CQI modalities was unlikely to produce any change in compliance with established national guidelines for practice and that CQI teams "may benefit from focusing more on implementing process changes with . . . established effectiveness" (Goldberg et al., 1998, p. 141). NPs, although a minority in number, were included in the study with no stratification given as far as their number in the composition of the veterans clinic portion of the sample.

NPs depend on medical models for practice and the physician as a professional resource. NPs need to be able to distinguish practice that is scientifically sound as compared to traditional or personal preferences in practice. Research is needed to evaluate NPs' management of HTN in their clients and their knowledge of national guidelines.

Another study, Siegel and Lopez (1997), investigated physician prescription patterns of antihypertension medications 3 years after the initiation of the Fifth Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC V). The research question was as follows: Do the JNC V recommendations affect prescribing? The JNC V recommendations that received significant focus were hydrochlorothiazide (HCTZ) and beta-blockers as first-line antihypertensives in the treatment of hypertension due to their results in reducing "cardiovascular mortality and morbidity . . . in long-term controlled clinical trials" (Siegel & Lopez, 1997, p. 1745). The researchers recognized that use of this treatment was based on the absence of contraindications or unacceptable circumstances for prescription (Siegel & Lopez, 1997). The variables under examination in this study were prescriptions written for hypertensive patients over a 3-year span. There were 200 medications that were

determined to be the most frequently prescribed and were calculated by information collected by Scott-Levin through surveys to retail pharmaceutical companies (Siegel & Lopez, 1997). The conceptual framework focused on the JNC V guidelines and the impression that some physicians are in disagreement with these guidelines.

Siegel and Lopez (1997) used a prospective, descriptive design that selected retail pharmacies as the population for the study. Retail pharmacies were defined as any of the following: chain pharmacies (27%), independent pharmacies (18%), pharmacy in mass merchandise stores (8%), and other (4%) (Siegel & Lopez, 1997). The retail market defined above was stated to "disperse approximately 68% of all pharmaceuticals and diagnostics in the United States" (Siegel & Lopez, 1997, p. 1746). The 35,000 retail pharmacies included in the study were drawn randomly from all 50 states in the United States. The population of retail pharmacies from which the sample was chosen was divided into 1,300 zones before being randomly selected. After being chosen, the retail pharmacies in each zone were evaluated for homogeneity in regard to prescription patterns using analysis of variance. Any zones with a large degree of variance in prescribing patterns were redefined to ensure homogeneity (Siegel & Lopez, 1997).

The frequency of a medication being prescribed was determined using data collection from the retail pharmacies during the 3-year study. National figures for prescriptions given from the pharmacies in the study were calculated by multiplying the number of prescriptions in one zone by a "zone area projection factor." This factor was determined by "dividing the total number of prescriptions dispensed for all [medications] by all retail pharmacies in the zone by the number of [one specific medication prescribed in that zone by all retail pharmacies]" (Siegel & Lopez, 1997, p. 1746). Thus, the data collected from all pharmacies in the study, which represented an estimate of 70% of all prescriptions in the United States for retail pharmacies, were projected to estimate all prescriptions prescribed by retail pharmacies in the United States.

During the analysis of data, the prescriptions were gathered into antihypertensive classes for the years 1992 and 1995, and the estimated mean for frequency of prescription was calculated from the total projected number of medications prescribed nationwide in retail pharmacies. The estimated total wholesale cost of each drug class prescribed was also calculated. The cost analysis was performed using "the average wholesale price

as published in the 1995 Drug Topic Handbook" (Siegel & Lopez, 1997, p. 1746).

The researchers reported an increase in the prescribing of calcium antagonist and ACE inhibitors and a reduction of diuretics and beta-blockers from 1992 to 1995. In the year 1992, 33% of antihypertensives prescribed were calcium antagonists and increased by 5% in 1995 to 38%. In the year 1992, 25% of the prescriptions were ACE inhibitors and increased 8% in 1995 to 33%. Beta-blocker prescriptions fell in number from 18% of all antihypertensive prescribed in 1992 to 11% in 1995, and diuretic prescriptions were cut in half with a drop from 16% in 1992 to only 8% in 1995 (Siegel & Lopez, 1997). There was also a tremendous cost associated with the prescription of calcium antagonist and ACE inhibitors when compared to the cost of diuretics and beta-blockers. The following cost analysis of calcium antagonist and ACE inhibitor and diuretics and beta-blockers was contained in the study:

The estimated US wholesale cost to retail pharmacies for calcium antagonists was \$2.67 billion in 1992 and \$2.86 billion in 1995. Costs for ACE inhibitors increased from approximately \$1.37 billion to \$1.67 billion. Costs for the diuretics decreased from \$353 million to \$168 million, while costs for the beta-blockers decreased from \$763 million to \$433 million during the same time period. (Siegel & Lopez, 1997, p. 1747)

If diuretics had been 38% of the prescribed antihypertensives for 1995, based upon previous figures, their cost would have been less than \$1 billion as compared to the cost of the calcium antagonist (\$2.86 billion) and ACE inhibitors (\$1.67 billion). Similarly beta-blockers also are cheaper in cost. Beta-blockers had an 11% prescription rate as compared to other antihypertensives and an estimated cost of \$433 million in 1995. If the beta-blocker prescription rate had been 33%, or three times what it was in 1995, then the associated cost, based upon figures above, would have been approximately \$1.2 billion. Siegel and Lopez supported this opinion by asserting, "In 1995, based upon the estimates herein the cost of each 1% of the national use of the calcium antagonist was \$75 million, while the cost of each 1% of diuretic use was \$21 million" (Siegel & Lopez, 1997, p. 1748).

The results of this study provided evidence that national guidelines concerning hypertension management do not affect prescription practices by health care providers despite long-term controlled trials that support its prescription practice recommendations. There were no recommendations concerning the noncompliance implied by the analysis of the data, but it is not difficult to understand that the implications of noncompliance are

costly. Siegel and Lopez do give some possible causes for the noncompliance to the JNC V guidelines including

Reduced results of diuretics and beta-blockers in reducing coronary artery disease, individualization of treatment based upon other conditions, lack of dissemination of JNC V recommendations, the attractiveness of using new therapies, and the sale tactics of pharmaceutical companies for the newer antihypertensives. (p. 1748)

Further study with health care personnel in primary care, such as family nurse practitioners (FNP), is needed to evaluate if noncompliance with national guidelines concerning prescription practice is prevalent in specific settings with specific health care practitioners.

Perry et al. (1998) provided supportive data that validated the competency of the JNC VI guidelines in regard to antihypertensive medication prescribing. This study also looked at hypertensive patients whose hypertension was managed by "nurses and physician assistants intensively trained in hypertension management" (Perry et al., 1998, p. 771) as primary care providers. These primary care providers used national hypertension treatment guidelines written by the National High Blood Pressure Education Program (NHBPEP) and Joint National Commission of Detection, Evaluation, and Treatment of High Blood Pressure (JNC) in treatment (Perry et al., 1998).

The authors were concerned with examining 12 different antihypertensive medication regimens chosen for treatment at Veterans Administration (VA) clinics and their efficacy in controlling hypertension. The variables examined were anti-hypertensive medication regimens as the independent variable and hypertension measurement as the dependent variable. There were two research questions to be answered by this study:

1. Which antihypertensive drugs were selected by the involved health care providers?

2. How effective [the antihypertensive drugs] were in achieving normotension?

The study was part of a Hypertension Screening and Treatment Program (HSTP) established by the Department of Veterans Affairs to provide hypertension treatment to veterans and was performed over 46 months from May 1989 to February 1993. The authors described normotension as a diastolic blood pressure measurement goal of 99 mmHg. Hypertension measurements were determined by an average of three readings "in minimally stressful conditions, with standardized mercury sphygmomanometers" (Perry et al., 1998, p. 722). The 12 antihypertension medication regimens were defined as

(a) ND, no antihypertensive therapy, (b) D, diuretic, (c) B, beta-blocker, (d) A, ACE inhibitors, (e) C, calcium antagonist, (f) OD,

other single antihypertensive drug, (g) D + B, diuretic plus beta-blocker, (h) D + S, diuretic + non-beta blocker sympatholytic agent, (i) D + A, diuretic + ACE inhibitor, (j) D + C, diuretic + calcium antagonist, (k) D + OD, diuretic + single antihypertensive agent not listed above, and (l) other. (Perry et al., 1998, p. 772)

A descriptive correlational design was used in this study and was interested in looking at the frequency of 12 different antihypertensive drug regimens prescribed by the health care providers in the study and the medication regimens efficacy in controlling hypertension by correlating each regimen's outcome to the outcome of other regimens in the study. The researchers imposed no control over the independent variable of antihypertensive medication regimens in this study. The population for the study was hypertensive veterans using VA clinics for treatment of their hypertension. A convenience sample of 6,100 veterans who visited one of six HSTP clinics were chosen for the study. The cohort studied was mainly male (> 98%), older than 60 years of age (> 55%) and equal in regard to Caucasian race (50%) and minority race (50%). The patients were observed and followed for hypertension data for an average of 6.4 ± 5.7 years and had a mean blood pressure of 148/92 mmHg upon entering the HSTP. The settings for the study were six HSTP clinics in a wide variety of geographical areas including the following:

Indianapolis, IN; Jackson, MS; Memphis, TN; St. Louis, MO; Iowa City, IO; and San Juan, Puerto Rico.

Data were collected from the sample ($N = 6,100$) using two forms. The first form gathered demographic and pre-HSTP data including age, race, sex, height, past and family histories, years of education, and marital status (Perry et al., 1998). The second form was used in two areas of data collection. First, it was used at each clinic visit to gather a self-reported compliance with antihypertensive drug regimen, an average of three blood pressure readings, symptoms of treatment and severity, medical history changes during time of study, other medications, and weight. Second, it was used yearly to evaluate alcohol intake, tobacco use, any abnormal physical signs observed during treatment, and incidence of target organ disease, and to document lab data (Perry et al., 1998). Data were collected and analyzed over a 46-month period from 41,498 clinic visits.

The most frequently used antihypertensives were diuretics (54%) with the majority of these diuretics being hydrochlorothiazide (55%). The next most frequently used antihypertensive drug regimens were calcium antagonists (33%). Analysis of systolic blood pressure and diastolic blood pressure in relationship to the medication regimens was performed. Diuretics and beta-blockers used in

combination provide the lowest average systolic blood pressure (140.1 mmHg) and calcium antagonist the highest (149.0 mmHg) (Perry et al., 1998). Diuretics also provided the lowest average diastolic blood pressure results (81.9 mmHg) in the study and calcium antagonist the highest average (86.5 mmHg). Out of the six clinics, the three that used diuretics more than newer anti-hypertensive agents of ACE inhibitors and calcium antagonists had an average 6.2 mmHg lower systolic blood pressure in patients (141.8/147.0) and a 5.7 mmHg lower average diastolic blood pressure (82.0/87.7) (Perry et al., 1998). The researchers used a two-factor ANOVA to analyze differences between all regimens. The difference of results in regimens analyzed in the seven most common regimens were considered significant ($p < .0001$) and included the following drug classes in the regimens either alone or in combination: (a) diuretic, (b) beta-blocker, (c) ACE inhibitor, and (d) calcium antagonists. Of all the regimens used, patients who were on diuretics needed the least amount of change in medication therapy (46% not needing change) as compared to patients on ACE inhibitors or calcium antagonist (18% not needing change).

The authors concluded that "for the elderly cohort and the clinical condition described here, the diuretic was a more potent antihypertensive agent than was the

calcium antagonist" (Perry et al., 1998, p. 777). Also, diuretics and beta-blockers were associated with both lower average blood pressures (both systolic and diastolic) and lower percentage of lower uncontrollable blood pressures (14.9%/28%) than calcium antagonists. The health care providers were noncompliant with JNC V guidelines to control systolic blood pressure ≤ 140 mmHg, and 5% had a treated systolic blood pressure ≥ 180 mmHg. This noncompliance may be partially due to no set goal for systolic blood pressure in the study, but the health care professionals were aware of national guidelines for treatment of systolic blood pressure as stated by the researcher in regard to the health care professionals using National High Blood Pressure Education Program and JNC guidelines in treatment. This study provides data that nurses and physician assistants, when competently using national hypertension treatment guidelines, can effectively control hypertension to goal levels agreed upon normotensive. The study, however, does show evidence that, despite the use of national treatment guidelines for hypertension, these health care professionals were not compliant in controlling systolic hypertension to a level established by the JNC guidelines. Further research must be done to isolate NPs as a population in treating hypertension to see if they are aware of hypertension

guidelines, implement these guidelines in practice, and whether their implementation of these guidelines is effective in controlling hypertension.

One study in which the results support the JNC VI guidelines used systematic review and meta-analysis of first-line antihypertensive medications for success in hypertension control (Psaty et al., 1997). The purpose of the study was to examine the efficacy of the four most common antihypertensive medication classes in preventing the occurrence of myocardial infarction and stroke through the control of hypertension.

Eighteen randomized clinical trials were found for analysis in the study by using MEDLINE and previous meta-analysis (Psaty et al., 1997). The patients ($N = 48,220$) included in these studies were from the United States, Europe, Scandinavia, Australia, and Japan.

The patients were followed for an average of 5 years in the studies. The patients were all middle-aged to elderly, and a few of the patients in various studies had "very high blood pressure or . . . survived a stroke" (Psaty et al., 1997, p. 740). The randomized trials were limited to trials which were "at least 1 year long, placebo controlled, and unconfounded by other therapies . . . we excluded multiple risk factor intervention trials and trials using first-line agents other than [diuretics,

B-blockers, calcium channel blockers, and ACE inhibitors]" (Psaty et al., 1997, p. 740). The authors stated no trials that evaluated calcium channel blockers and ACE inhibitors were found in regard to the criteria, so all 18 trials were related to diuretics and B-blockers and were all previously used in a meta-analysis study. Data for the study were gathered by Psaty and Nichols and "differences were resolved by consensus" (Psaty et al., 1997, p. 740).

The clinical trials in the study were classified into three treatment strategies, as follows: "(1) high-dose diuretic therapy . . . doses greater than or equal to the equivalent of 50 mg of chlorthalidone or hydrochlorothiazide (HCTZ), (2) low-dose diuretic . . . the equivalent of 12.5 to 25 mg per day of chlorthalidone or HCTZ, and (3) B-blocker therapy" (Psaty et al., 1997, p. 740). The ACE inhibitor and calcium channel blocker trials were selected from "the largest and longest trials evaluating surrogate endpoints . . . for the special indicators [of myocardial infraction and stroke] we relied upon recent meta-analysis" (Psaty et al., 1997, p. 740).

All three treatment strategies of high-dose diuretics, low-dose diuretics, and B-blocker decreased the incidence of stroke in patients who had hypertension with relative risks (RR) of .49, 0.66, and 0.71, respectively. The occurrence of stroke with the high-dose diuretics was

significantly different from the use of B-blocker therapy ($p = .02$), but was not significant in comparison to the low-dose diuretic therapy. In regard to coronary artery disease, which is a precursor to myocardial infarction, high-dose diuretic therapy and B-blocker therapy had similar RR of 0.99 and 0.93, but did not produce results significantly different from the placebo. Low-dose diuretic therapy, on the other hand, was significant in its ability to reduce coronary artery disease when compared to the other two strategies mentioned with an RR of 0.72 and a statistical significance to B-blockers of $p = .03$ and high-dose diuretics ($p = .01$) (Psaty et al., 1997).

Compelling clinical trials for ACE inhibitors and calcium channel blockers were discussed by the author, but no meta-analysis was performed due to a lack of long-term trials. Instead, the authors reviewed various clinical trials in support of certain antihypertensives as first-line therapy in specific populations as recommended by the JNC VI guidelines for hypertension treatment. Alarming information on Nifedipine and short-acting calcium channel blockers was discussed by the authors. In six clinical trials concerning the calcium channel blocker, Nifedipine, at a dose of 80 mg or more per day there was an increased RR of mortality (2.64, 95% CI, 1.42 - 4.92) associated

with the therapy (Psaty et al., 1997). Also, in the Seattle, Washington, case-control study mentioned by the author, "short-acting calcium channel blockers were associated with an increased risk of myocardial infarction . . . than beta-blockers [in] subjects with or without CVD (risk ratio, 1.57; 95% CI, 1.24 - 2.04; $p < .001$)" (Psaty et al., 1997, p. 743). One meta-analysis study on ACE inhibitors' effect on reducing mortality in patients with congestive heart failure was reviewed by the author. Psaty et al. stated, "In the meta-analysis by Garg and colleagues, the RR for total mortality was 0.77 (95% CI, 0.58 - 0.83), and the reduction was primarily due to fewer deaths from progressive heart failure (RR, 0.69, 95% CI, 0.58 - 0.83)" (p. 742).

Although the authors did not do a meta-analysis of data for ACE inhibitors and calcium channel blocker clinical trials reviewed, they make a strong statement in favor of diuretics and beta-blockers rather than these newer antihypertensives due to a lack of long-term controlled clinical trials toward various end-points of cardiovascular disease prevention or progression. Psaty et al. supported diuretics and beta-blockers as first-line therapy by stating that,

Diuretics and B-blockers--inexpensive antihypertensive agents--have been proven both safe and effective in long-term trials . . . the

clinical rationale for withholding safe, effective, and proven therapies must be compelling . . . the potential benefit of a surrogate end point or a laboratory value must be weighed thoughtfully against the known health risks of withholding the proven first-line therapies currently recommended by the JNC-V. (Psaty et al., 1997, p. 744)

These findings supported the JNC VI guidelines that were published in the same year, as diuretics and beta-blockers were still recommended as first-line treatments for hypertension.

Another study found in the review of literature supported the JNC VI recommendations to control blood pressure of patients with hypertension to a level $\leq 140/90$ mmHg. The Hypertension Optimal Treatment (HOT) randomized trial sought to ascertain the association of intensive blood pressure lowering regimens and cardiovascular complications in hypertensive patients (Hansson et al., 1998). The study wanted to see if there was a correlation between lower diastolic blood pressure readings over time and subsequent cardiovascular events.

The study was a randomized trial composed of 18,790 patients from 26 different countries. The patients were 50 to 80 years in age, with a mean age of 61.5 years. Each person in the sample was randomly assigned to a target diastolic blood pressure level of ≤ 90 mmHg, ≤ 85 mmHg, or equal to 80 mmHg in the study in which half received

acetylsalicylic acid (ASA) and the other half placebo (Hansson et al., 1998). The countries for the study were selected from the following four continents: North America, South America, Europe, and Asia. The sample was followed up for cardiovascular events for an average of 3.8 years (range 3.3 - 4.9) (Hansson et al., 1998).

Patients were treated in one of five different modes to obtain the diastolic blood pressure level desired as follows: Step 1: felodipine (calcium channel blocker) 5 mg a day, Step 2: ACE inhibitor or beta-blocker added to step 1, Step 3: titration of the dosage of felodipine to 10 mg a day with ACE inhibitor or beta-blocker, Step 4: doubling the dosage of ACE inhibitor or beta-blocker in Step 2 with felodipine, and Step 5: adding a diuretic to ACE inhibitor/beta-blocker and felodipine therapy in Step 4 (Hansson et al., 1998). Blood pressure measurements were measured using, "an oscillometric semi-automatic device (Visomat OZ, D2, International, Hestia, Germany)" (Hansson et al., 1998, p. 1756). The validity and accuracy of the machine to measure blood pressures were "subjected to the blood-pressure-measuring equipment proposed by the British Hypertension Society and was found to meet those stringent criteria" (Hansson et al., 1998, p. 1757).

For the purpose of the study, major cardiovascular events were described as "fatal and non-fatal myocardial

infarction (MI), all strokes and all other cardiovascular death" (Hansson et al., 1998, p. 1756). Reported events were gathered from hospital and physician records, death certificates, and N. reports. Fatal events were described as death that occurred within 28 days of onset of a cardiovascular event. Silent MIs were also evaluated for and were classified as a change of a new Q wave or QS waves from a baseline ECG reading without the patient portraying any signs or symptoms.

The study used a Poisson model to analyze the trends of CV events between the different groups with assigned target blood pressures. Hansson and colleagues stated,

The logarithm of the hazard rate was modeled as a continuous function of mean blood pressure by connected linear and quadratic pieces in specified intervals . . . time dependent information was used for the covariants current age, time from entry and blood pressure frame every 6 months . . . two-tailed tests were used. (p. 1757)

The researchers found that the patients who participated in one of the five antihypertensive treatment regimens had a reduction in their systolic and diastolic blood pressure. The antihypertensive regimens reduced the average diastolic blood pressure (DBP) by 20.3 mmHg, 22.3 mmHg, and 24.3 mmHg and the average systolic blood pressure (SBP) by 26.2 mmHg, 28.0 mmHg, and 29.9 mmHg in the targeted DBP groups of ≤ 90 mmHg, ≤ 85 mmHg, and ≤ 80

mmHg, respectively, when compared to DBP levels at baseline (Hansson et al., 1998). There were very few patients in the study with a DBP > 90 mmHg after receiving antihypertensive treatment. Only 12%, 7%, and 6% of the target group of ≤ 90 mmHg, ≤ 85 mmHg, and ≤ 80 mmHg had DBP greater than 90 mmHg following treatment. The patients receiving Aspirin (ASA) therapy did not have a significantly different average blood pressure reading than those who did not (142/83.2 mmHg vs. 141.4/82.9 mmHg). Patients whose diastolic blood pressure (DBP) was controlled to ≤ 85 mmHg and ≤ 80 mmHg had significantly reduced risks of certain cardiovascular (CV) events when compared to the group assigned a target blood pressure of ≤ 90 mmHg. The events of all MIs were found to be reduced by 25% in the group with a target DBP of ≤ 85 mmHg and by 28% in the group with a target DBP of ≤ 80 mmHg when compared with the patients in the target DBP group of ≤ 90 mmHg.

Diabetic patients had a marked reduction of CV events in the group of ≤ 80 mmHg when compared to the group of ≤ 90 mmHg as target DBPs. In 1,501 of the patients with diabetes mellitus, the risk of a major CV was found to be 50% less in the ≤ 80 mmHg DBP group than those in the ≤ 90 mmHg group. The event of stroke in the diabetic patients was also reduced in the target group with target DBP of

≤ 80 mmHg by 30% when compared to the ≤ 90 mmHg group (Hansson et al., 1998).

Another significant finding in the study was the reduction in the incidence of stroke in patients with previous ischemic heart disease with a 43% reduction in the DBP target group of ≤ 80 mmHg versus the DBP target group of ≤ 90 mmHg. It is important to note that the average DBP after treatment in the ≤ 80 mmHg group was not ≤ 80 mmHg but 81.1 mmHg ($SD = 5.3$) following antihypertensive treatment. The average DBP of the ≤ 90 mmHg group and ≤ 85 mmHg group after treatment was 85.2 mmHg ($SD = 5.1$) and 83.2 ($SD = 4.8$), respectively.

In conclusion, Hansson and colleagues asserted, "intensive lowering of blood pressure in patients with hypertension was associated with a low rate of cardiovascular events . . . the HOT study shows the benefit of lowering the DBP down to 82.6 mmHg" (1998, p. 1755). These findings support the JNC VI guidelines which recommend that health care providers control their hypertensive patients' blood pressure to $\leq 140/90$ in patients without target organ disease and $\leq 130/85$ mmHg in patients with diabetes. The JNC VI guidelines state that,

The goal of prevention and management of hypertension is to reduce morbidity and mortality by the least intrusive means possible . . . this may be accomplished by achieving and maintaining systolic blood pressure below 140

mmHg and DBP below 90 mmHg and lower if tolerated. (JNC VI, 1997, p. 19)

The results also support the JNC VI recommendation for more aggressive treatment of hypertension in the elderly to prevent fatal CV events, as many of the patients were > 65 years of age with an average age of 61.5 years (Range: 50 to 80).

Staessen et al. (2000) asserted that the results of their study supported the JNC VI guidelines concerning the treatment of systolic blood pressure to a level to prevent target organ damage (Staessen et al., 1998). These researchers were interested in the outcomes of treated and untreated isolated systolic hypertensive patients. The study was a meta-analysis study that focused on outcome trials concerning isolated systolic hypertension (ISH) and subsequent associated risks.

The sample of patients to be analyzed in the meta-analysis was formed samples from eight total trials reviewed. Three studies were outcome trials directly related to ISH. The five other trials were outcome-based hypertension trials that included ISH patients as a subgroup. A total of 15,693 patients from the eight clinical trials were included in the meta-analysis group. The majority of the patients in the study, excluding the China trial, were female and had an average age of 70

years (Range: 60 to 760). Smokers composed 15.8% of the sample, and 30.9% of the sample had one or more cardiovascular complications before their individual trial began. Concerning those patients with previous cardiovascular disease or complications, 4.5% had a stroke, 7.4% had a myocardial infarction (MI), 14.2% had symptoms of angina, and 33% had ECG changes that were indicative of left ventricular hypertrophy (Staessen et al., 1998).

These authors defined ISH as a systolic blood pressure ≥ 160 mmHg with a diastolic pressure of < 95 mmHg. The outcome criteria that were evaluated for regarding their association with ISH were as follows: (a) total and cardiovascular mortality, (b) cardiovascular complications, (c) stroke, and (d) coronary events (Staessen et al., 2000).

In analysis of the eight different outcome trials concerning ISH, the researchers used "nonparametric methods and Cox regression to model the risks associated with blood pressure and to correct for regression dilution bias" (Staessen et al., 2000, p. 865). Various antihypertensive drug regimens were used in each trial analyzed to reach target blood pressures and all trials were controlled. In the Cox regression statistical method, used by the researchers, age, sex, and systolic and

diastolic blood pressures at baseline were explanatory variables. Correction for regression dilution bias was estimated by the researchers using a "cohort of patients randomized to no treatment who accumulated an event free survival for two years" (Staessen et al., 2000, p. 866). The researchers "calculated relative benefit as the percentage reduction in the outcome rates in the active treatment group compared with the rate in the control groups . . . absolute benefit with [a] 95% CI" (Staessen et al., 2000, p. 866).

The researchers found a reduction of overall mortality and cardiovascular events. One significant result was the risk of total mortality associated with ISH was less than that of diastolic hypertension at the beginning of the trial before a treatment plan was started ($p = .001$ vs. $p = .05$, respectively). Analysis of the four outcomes, previously stated, after pharmacologic treatment with antihypertensives was significant as well. There was a 13% (2-22, $p = .02$) reduction in total mortality in patients with a treated systolic blood pressure (SBP) level < 160 mmHg when compared to the control group and an 18% (4-29, $p = .01$) reduction in cardiovascular related death. Patients, in the trials treated to a SBP < 160 mmHg, also produced a total pooled result of a 26% (17-34, $p < .001$) reduction in cardiovascular complications, a 30%

(18-41, $p < .001$) reduction of stroke, and a 23% (10-34, $p = .001$) reduction in coronary events when compared to the control group (Staessen et al., 2000).

Staessen and colleagues stated after interpretation of the results that, "Drug treatment is justified in older patients with isolated systolic hypertension where systolic blood pressure is 160 mmHg or higher" (Staessen et al., 2000, p. 872). This study's results and interpretations support the JNC VI guidelines published in 1997 which support a more aggressive treatment of hypertension in elderly patients to reduce subsequent cardiovascular mortality and target organ disease. The study provided significant results that support previous research that a treatment regimen to reduce ISH reduces the risk for cardiovascular mortality and events as recommended by the JNC VI guidelines which affirms

The goal of treatment in older patients should be the same as in younger patients (to below 140/90 mmHg if at all possible), although an interim goal of systolic blood pressure below 160 mmHg may be necessary in those patients with marked systolic hypertension. (JNC VI, 1997, p. 46)

Another clinical trial supports the JNC VI guidelines in regard to its special recommendation to use ACE inhibitors to treat hypertension in diabetic patients. The clinical trial performed by Morgenson studied the effects of the ACE inhibitor lisinopril and Candesartan on the

outcome variables of blood pressure and microalbuminuria (Morgenson, 2000).

The clinical trial, a prospective, randomized, parallel group, double blind study, was performed in 37 hospitals/primary care centers in Australia, Denmark, Finland, and Israel (Morgenson, 2000). The population from which the sample was chosen was type 2 diabetics who had previously been diagnosed with hypertension and microalbuminuria. The sample was composed of 199 type 2 diabetics with a mean age of 60 years (Range: 30-75) and had the following criteria: (a) urinary albumin: creatinine ratio of 2.5 - 25 mcg/mmol after 2 weeks of placebo treatment and (b) a diastolic blood pressure of 90 - 110 mmHg following both 2 and 4 weeks of placebo treatment (Morgenson, 2000). Two patients were excluded from the study due to refusal to take treatment regimen leaving 197 patients who actively received treatment. Criteria used to exclude people during the sampling process were as follows: (a) a body mass index (BMI) of ≥ 40 kg/m², (b) a systolic blood pressure > 200 mmHg, (c) a non-diabetic cause of secondary hypertension, (d) a serum creatinine level of 130 x 6 μ mol/L in women and 150 x 6 μ mol/L in men, (e) a serum potassium level > 5.5 mmol/L, (f) a hemoglobin A_{1c} of greater than 10%, (g) potential or actual pregnancy, and (h) patient breast-feeding

(Morgenson, 2000, p. 1442). Patients taking lisinopril only during the study were by majority male ($N = 62$) compared to women ($N = 36$) and had a mean BMI of 29.8 kg/m², a mean systolic blood pressure of 162.6 mmHg ($SD = 17.6$), and a mean diastolic blood pressure of 95.7 mmHg ($SD = 6.2$ mmHg) before treatment. The patients, on average, had been diabetics for 8.4 years ($SD = 7.3$) and hypertensive for 9.0 years ($SD = 8.9$). These patients also had a mean urinary albumin:creatinine ratio of 6.6 mcg/mmol ($SD = 1.1$) and a mean hemoglobin A_{1c} of 7.6% ($SD = 1.6\%$). Fourteen of the 197 randomized patients who underwent active treatment dropped out due to bothersome side effects, with the main adverse side effects of dizziness, feeling weak, or both (Morgenson, 2000).

The methods of the study included an antihypertensive regimen of either lisinopril, Candesartan, or combination over 24 weeks while evaluating each regimen's effect on the outcome criteria of hypertension and microalbuminuria. Baseline hypertension levels and urinary albumin:creatinine ratios were drawn and evaluated and evaluated again at 12 weeks and 24 weeks post-treatment. The post-placebo/treatment phase consisted of two phases of treatment. In the first phase of treatment the sample was divided into two groups. The first group received lisinopril treatment only for 12 weeks and the second

group, Candesartan, for 12 weeks. The second phase of the treatment regimen lasted from the 12th week to the 24th week and split the sample into three groups. The first group was treated with lisinopril only. The second group was treated with Candesartan only. The third group was treated with a combination of lisinopril and Candesartan as long as the patient had a diastolic blood pressure \geq 80 mmHg at 12 weeks following their previous treatment regimen. The daily dose of Candesartan used was 16 mg, and the daily dose of lisinopril was 20 mg.

Blood pressure measurements were taken in the arm with each patient resting for 5 minutes at approximately 24 hours post-treatment with antihypertensive medicine. An automated blood pressure machine was used to take measurements. Three blood pressure measurements were taken sitting and averaged and then one measurement after standing for 1 min. A total of nine blood pressure measurement sessions were performed during the study. Three sessions were conducted before treatment to produce an established baseline blood pressure.

Microalbuminuria was measured through urinary albumin:creatinine ratios. The urine samples used for ratios were spot samples taken on two consecutive days by the patients in the morning and brought to the clinic where serum creatinine levels were drawn. These

microalbuminuria results were performed before treatment as a baseline measurement and then reevaluated at 12 and 24 weeks. Urinalysis, hematology, and hemoglobin A_{1c} measurements also were taken at baseline, 12 weeks, and 24 weeks.

The researchers used a linear model for analysis of covariance when averaging the change of microalbuminuria from baseline at 12 weeks and 24 weeks (Morgenson, 2000). The analysis of covariance used "factors for treatment, centre, and interaction between them . . . changes in diastolic blood pressure and body weight . . . as covariates" (Morgenson, 2000, p. 1442). The results were shown as "estimates of the true geometric means and as estimates of ratios of the true geometric means, with their 95% confidence intervals and corresponding *p* values" (Morgenson, 2000, p. 1442).

Patients treated with lisinopril only achieved a 9.7% (7.9 - 11.5, *p* < .0001) reduction in sitting diastolic pressure, a 15.7% (12.2 - 19.2, *p* < .001) reduction in sitting systolic pressure, and a 46% (35 - 56, *p* < .001) reduction in microalbuminuria at 12 weeks post-treatment with a 20-mg daily dose. Outcomes at 24 weeks were also significant with a 10.7% (8 - 13.5, *p* < .001) reduction in sitting diastolic blood pressure, a 16.7% (11.4 - 21.9, *p* < .001) reduction in sitting systolic blood pressure, and

a 39% (20 - 54, $p < .001$) reduction microalbuminuria. The researcher stated that the best results for the study came from patients receiving the combination therapy of Candesartan and lisinopril but were not reproduced here due to Candesartan not being an ACE inhibitor and therefore not recommended by the JNC VI recommendations which concluded that, "in patients with diabetic nephropathy ACE inhibitors are preferred" (NHLBI, 1997, p. 49).

The author concluded that,

Recent guidelines for blood pressure targets in diabetic patients have emphasized the importance of aggressive blood pressure reduction in diabetic patients with evidence of renal disease . . . our results show that dual blockade of renin-angiotensin system particularly effective in decreasing blood pressure in these patients and supports this . . . therapeutic approach for the prevention of diabetic renal and vascular disorders. (Morgenson, 2001, p. 1444)

Lisinopril treatment alone, however, was also very effective in its blockage of the renin-angiotensin system and produced significant effects in decreasing hypertension microalbuminuria. This study further supports the studies reviewed by the JNC VI which recommended ACE inhibitors as the preferred treatment regimen for diabetic hypertensive patients to prevent future cardiovascular disease and diabetic complications such as nephropathy.

Although the review of the literature was not exhaustive in nature, it is sufficient in its ability to support a need for further dissemination of the JNC VI guidelines. It also supports the need for further research for compliance with these guidelines in the future. The recently published studies reviewed here further support the validity of the research-based JNC VI guidelines published in 1997. The review of literature chosen for this study was chosen by the researcher for strength to support the JNC VI guidelines and ability to support the tool used for measuring compliance with the JNC VI guidelines in this study.

Chapter III

The Method

This researcher was concerned with evaluating primary care nurse practitioners' (PCNPs) compliance with the JNC VI guidelines in the management of hypertension and will be used to formulate strategies to increase compliance with these guidelines in the future to ensure evidence-based medicine in the treatment of this national health concern.

Design of the Study

The researcher used a descriptive design to define the implementation of the sixth edition of the Joint National Committee guidelines (JNC VI) for hypertension management in practice. A descriptive design was appropriate because its focus is on "the frequency of occurrence" in variables and does not seek to form relationships between variables (Polit & Hungler, 1999, p. 196). This researcher sought data for explaining PCNPs' use of the guidelines established by the JNC VI, and not to determine any relationship to actual blood pressure readings as an evaluation of hypertension management.

These data were easily analyzed and disseminated back to PCNPs in practice with this design and was considered important to the researcher so PCNPs could critique their hypertension management strategies in an effective and timely manner.

Setting, Population, and Sample

Setting. The settings for the study were various outpatient, primary care practice sites within the states of Mississippi, Alabama, Tennessee, and Louisiana. Each primary care practice had at least one PCNP who treated on average at least 5 hypertensive patients per day. Sites were obtained by assessing the qualifications of each PCNP through a self-report survey included in the study. Sites that were reported were as follows: (a) hospital clinic, (b) free clinic, (c) health department, and (d) private practice.

Population. The population for the study were advanced practice nurses, who were licensed and certified in the states of Mississippi to practice in the role of an PCNP. The PCNPs were experienced in treating adult hypertensive patients, had at least 1 year of experience as a family nurse practitioner (FNP) or advanced practice nurse (ANP), and worked in outpatient settings as a primary care provider in the states of Alabama, Louisiana,

Tennessee, and Mississippi. The specific population from which the sample was drawn was a database of FNPs and ANPs certified within the state of Mississippi containing over 600 names of PCNPs. For subjects to be included in the study they had to see and treat, on average, a minimum of at least 5 hypertensive patients per day and was assessed for by self-report.

Sample. The sample for the study was achieved using a systematic random sampling design until 200 prospective subjects were garnered. The sample was selected from an NP database obtained from the Mississippi Board of Nursing as the sampling frame by using a computer-generated table of random numbers. PCNPs who did not work in an outpatient setting or see at least 5 hypertensive patients per day were excluded from the sample when data were returned by assessing this criteria on a self-reported demographic data sheet returned by mail. The final sample included those subjects who met the criteria and returned Cagle's JNC VI Guidelines Compliance Survey (see Appendix A) to be included in the study.

Instrumentation

Cagle's JNC VI Guidelines Compliance Survey was used to assess the PCNPs' implementation of the JNC VI guidelines in practice. The tool was vignettes developed

by the researcher to evaluate PCNPs' beliefs, knowledge, and practices in hypertension care, especially hypertension management strategies that are recommended by the JNC VI. These vignettes were case studies about hypertension management situations that included patients with varying co-morbidity. The vignettes focused on both essential hypertension and hypertension that could be secondary to disease process. The vignettes were developed to evaluate PCNPs' treatment practices by having the PCNPs write out interventions for each case study in three areas: (a) pharmacologic, (b) non-pharmacologic, and (c) labs and procedures that could be ordered by the FNP in the management of hypertension. The labs or procedures (area c) could be checked if the PCNP believed they were needed and there was a space for the PCNPs to write in any labs or procedures that they felt would be necessary in managing the patient's hypertension. All labs and procedures that are recommended by the JNC VI guidelines for each case study were provided as a choice along with other tests that are not recommended.

Ten critical factors, JNC VI guidelines recommendations, were identified and chosen as essential for competent hypertension management practice for the areas of (a), (b), and (c). Scoring of the vignettes were performed by evaluating the frequency of JNC VI guidelines

interventions chosen or written in by the PCNPs in regard to each case study.

The second case study was scored by giving one point in the pharmacologic area for starting this patient on an ACE inhibitor, ACE inhibitor plus diuretic, or increasing the dose of her hydrochlorothiazide (HCTZ) due to the patient's past history of left-sided heart enlargement (probably left ventricular hypertrophy) and supporting symptoms of shortness of breath with activity. Beta-blockers are contraindicated due to her history of COPD, and calcium channel blockers are not as effective in preventing the occurrence of congestive heart failure like ACE inhibitors. The JNC VI (NHLBI, 1997) guidelines state,

Some patients with hypertension (current or past) develop heart failure with a normal ejection fraction, implying diastolic dysfunction . . . the Framingham Heart Study have demonstrated that hypertension continues to be the major cause of left ventricular failure . . . dihydropyridine calcium antagonists [Lotrel] and Felodipine have been demonstrated to be safe in treating angina and hypertension in patients with advanced left ventricular dysfunction when used in addition to ACE inhibitors, diuretic, or digoxin . . . other calcium antagonists are not recommended in these patients. (p. 47)

One point was awarded in the non-pharmacologic area if lifestyle modifications were addressed including at least counseling on a healthy heart diet. One point was awarded in the diagnostic tests/lab area if the PCNP ordered at least the following tests: urinalysis,

electrolytes, EKG, and a lipid profile. The JNC VI guidelines recommend limited echocardiography in patients with LVH due to cost and an EKG can detect its presence. The PCNPs were not penalized for ordering an echocardiogram (Echo) due to the patient's complaints of shortness of breath and 3 years since last Echo. Although, requesting the old echo and a full cardiovascular examination may eliminate the need due to no shortness of breath at rest and would surely benefit this grandmother on Medicaid by saving her the money of an unwarranted Echo. The PCNPs were not penalized for not including a urinalysis as long as they spoke to getting electrolytes with BUN/creatinine or similar profile. Other tests may have been warranted and ordered to help with the clinical picture, but the diagnostic tests/labs chosen were considered critical test/labs to be ordered due to this patient being on a diuretic. Also, this patient needed her renal function checked before starting an ACE inhibitor, an EKG to confirm LVH and rule out any myocardial infarction, and a lipid profile to assess for hyperlipidemia as a future MI risk factor that can be controlled. All of these tests are recommended as routine tests to be run before starting antihypertensive pharmacologic treatment by the JNC VI (NHLBI, 1997).

The third and last case study was scored by giving one point in the pharmacologic area for the following: (a) changing the patient to another ACE, (b) change to another ACE + diuretic, (c) change to Angiotensin II receptor antagonist, or (d) placing the patient on a calcium antagonist plus ACE inhibitor. The main result to achieve in this patient and gain a point was renoprotection. The JNC VI guidelines state that ACE inhibitors are the preferred antihypertensive agent for diabetics to prevent diabetic nephropathy and for this reason should not be removed from this patient even though other medicines offer some renoprotection. ACE inhibitors also may have a favorable effect on patients with the co-morbid condition of renal insufficiency, which is a possibility with this noncompliant African American diabetic whose blood sugar and diet are uncontrolled. The patient has a family history of renal failure and has symptoms of polyuria which, although is probably related to his diabetes, is also a symptom of acute renal failure/insufficiency. The JNC VI states,

Hypertensive nephrosclerosis is among the most common causes of progressive renal disease, particularly in African Americans . . . impressive results have been achieved with ACE inhibitors with type 1 diabetic nephropathy, in patients with proteinuria greater than 1 gm in 24 hours, and in patients with renal insufficiency . . . consequently, patients with hypertension who have renal insufficiency should

receive, unless contraindicated, an ACE inhibitor in most cases, along with a diuretic to control hypertension and slow progressive renal failure. (NHLBI, 1997, p. 48)

Calcium channel blockers by themselves and beta-blockers were considered to be inadequate treatment due to JNC VI recommendations.

Consideration was given on whether or not to include long-acting, once-daily-dosing as criteria to receive the point in this category, but was eliminated due to the alteration in response that was expected in return of the survey. The researcher would have had difficulty ascertaining if once-daily-dosing was implied with medication change or combination agents and specific instructions on prescription were not given to guide this response.

The nonpharmacologic area was scored by receiving one half point for the following interventions: tobacco cessation and alcohol moderation. One point was received for diet modification that included a low-sodium diet (< 3 g/day). The JNC VI asserts that,

Excessive alcohol intake is an important risk factor for high blood pressure, can cause resistance to antihypertensive therapy and is a risk factor for stroke . . . alcohol should be [limited daily to] no more than 1 ounce of ethanol . . . or 2 ounces of 100 proof whiskey . . . such amounts do not raise blood pressure and have been associated with a lower risk of CHD. (p. 21)

The JNC VI also states that,

African Americans, older people, and patients with hypertension or diabetes are more sensitive to changes in dietary sodium chloride . . . meta-analysis of clinical trials reveals that a reduction of 75 to 100 mmol in sodium intake lowers blood pressure over periods of several weeks to a few years . . . [and one meta-analysis found that] patients age 45 or older with hypertension found an average decrease of 6.3/2.2 mmHg with a urinary sodium reduction of 95 mmol per day. (p. 21)

Concerning the tobacco cessation intervention, the JNC VI states that, "Cigarette smoking is a powerful risk factor for cardiovascular disease, and avoidance of tobacco in any form is essential . . . the cardiovascular benefits of discontinuing tobacco use can be seen within a year in all age groups" (NHLBI, 1997, p. 23). These JNC VI recommendations are critical factors for this African American patient who binge drinks on the weekends, smokes, and seems to be noncompliant with his diabetic diet and treatment regimen.

The diagnostic/labs intervention area was scored by awarding 1 point for ordering the following tests/labs: urinalysis, fasting glucose, lipid profile, 24-hour urine protein/creatinine clearance, electrolytes, and EKG. PCNPs were not penalized for not ordering a fasting blood sugar if they ordered an HgbA_{1c} or a metabolic profile which included a serum glucose. These are better tests to measure diabetic compliance than a fasting blood sugar.

The PCNPs also were not penalized for not ordering a 24-hour urine if they spoke to assessing the urinalysis first, ordered an electrolyte profile with BUN/creatinine, or ordered a 24-hour urine for microalbuminuria. These tests were considered critical labs to order for this patient due to his presentation and medical and family history.

The vignettes were assumed to have face value validity in assessing PCNPs' use of JNC VI guidelines in practice as agreed upon by the researcher and three other FNPs with hypertension management education. The FNPs chosen for peer review of the vignettes for content validity each had over 5 years of experience as an FNP and were familiar with the JNC VI guidelines. The vignettes were peer reviewed for readability and comprehension by the FNPs previously mentioned and 28 FNP students at the Mississippi University for Women.

Methods of Data Collection

The research study proposal was first submitted for approval by the Mississippi University for Women's Committee on Use of Human Subjects in Experimentation to gain acceptance of the study in regard to confidentiality and beneficence to participants and the overall benefits and risks (see Appendix B). Following approval, the

database/PCNP list was secured from the Mississippi Board of Nursing. After obtaining an adequate random sample of 200 PCNPs for the study, a point of contact for each PCNP was established via the database used in the sampling process. Each prospective participant was sent a packet including a cover letter (see Appendix C) describing the study and the Cagle's JNC VI Guidelines Compliance Survey and a self-addressed, stamped envelope. Each prospective PCNP was informed that return of the survey included would imply consent to participate in the study. Each cover letter also included the researcher's address, telephone number, and e-mail address so each PCNP could have access to the researcher for any questions regarding the study.

Two weeks following the first mailing, a second correspondence was sent including a reminder letter for participation (see Appendix D). An additional question was sent following the second mailing on a self-addressed, stamped postcard (see Appendix E). The final question was as follows: Are you aware of the current national guidelines (JNC VI) for hypertension management? This question was used to assess awareness and need for further dissemination of the JNC VI guidelines to PCNPs in practice and insight as possible explanation for some PCNP noncompliance with the JNC VI guidelines. The question was mailed with the last survey and was returned with a self-

addressed, stamped envelope. The participants were informed to return mailings without their name or address to ensure confidentiality.

These data were analyzed using descriptive statistics and disseminated back to PCNPs who participated in the study at their discretion. Information on how to obtain the results of the study and the JNC VI guidelines was made available to the PCNPs who participated in the study at their request by contacting the researcher via phone or E-mail.

Data Analysis

Data returned from the vignettes, as provided by the PCNPs in the study, were analyzed using univariate descriptive statistics, such as frequency distribution of scores and the variability of individual scores in the form of range and standard deviation. There were 10 critical factors/JNC VI guidelines to be measured by the vignettes provided to the PCNPs in the study. Each critical factor received a score of +1 if written in or chosen as an intervention with 0 being the lowest individual score obtainable and 10 being the highest. The group mean score of all the PCNPs multiplied by the number of PCNPs in the study ($N = 200$) was obtained and divided by the total best possible score of 2,000 to elicit a

percentile grade for the sample. The best case percentile score and worst case percentile score also were reported. The FNPs were required to get all critical factors correct for each case study to be considered completely compliant in implementing JNC VI guidelines for the particular case study and a minimum of two to three critical factors for each case study to be considered partially compliant. This equaled an overall score of 10 for participants who were considered completely compliant with JNC VI guidelines and a score of 7 to 9 considered partially compliant. Any score of less than 2 critical factors for one individual case or an overall survey score of less than 7 was evaluated as noncompliance with the JNC VI guidelines in treatment. The number of PCNPs who fell into each category of compliant, partially compliant, or noncompliant were reported in number and as a percentile of the total sample for each case study and the total study. Finally, the range between the lowest individual score and the highest individual score, along with a measurement of standard deviation in scores, were obtained to show the degree of homogeneity in scores. This procedure was used to assess the validity of the survey in producing scores that would implicate a high degree of homogeneity in comprehension and use of the survey to provide data for the study. Results were checked for accuracy by a research committee

and were provided in both narrative form and in the form of tables to enhance comprehension of the data by consumers of the research in the future.

Chapter IV

The Findings

This study, which was concerned with primary care nurse practitioners' (PCNPs) compliance with the JNC VI guidelines in the management of hypertension, used a survey method to gather data for analysis. The data returned via the Cagle's JNC VI Guidelines Compliance Survey were scored using 10 critical factors/JNC guideline parameters established for each case study. Three points/parameters were allotted for the first two case studies and 4 points for the last case study. One point/parameter was available for each case study intervention area of pharmacologic, non-pharmacologic, and diagnostic tests/labs, except for Case #3 which had two points available in the non-pharmacologic intervention area. Data collection began on May 30, 2001, and ended on June 16, 2001. This chapter is focused on PCNPs' compliance with JNC VI guidelines and contains the demographic, descriptive data concerning the sample and analysis of the results of the returned Cagle's JNC VI Guidelines Compliance Survey.

Description of the Sample

The Cagle's JNC VI Guidelines Compliance Survey was returned by 53 (26.5%) PCNPs out of 200 surveys mailed. Of the 53 respondents, 16 (37%) of the PCNPs had to be eliminated from participating in the study due to not meeting the requirement of treating, on average, at least 5 hypertensive patients a day. The final sample of PCNPs ($N = 37$) were by majority master's prepared ($n = 35$, 94.6%) and had ≤ 5 years of experience as a primary care practitioner ($n = 22$, 61.1%). The majority of the PCNPs worked in a private practice ($n = 24$, 64.9%), followed by hospital clinics ($n = 10$, 27%) and free clinics, health departments, community clinics ($n = 6$, 16.2%). The average years of experience of the PCNPs was 5.5 years (Range: 1-25, $SD = 2.1$) with only three PCNPs having more than 10 years of experience.

Results of Data Analysis

A total score of 10 was considered to be compliance with the JNC VI guidelines, and a score of 7 to 9 was partial compliance. Any score less than 7 was considered noncompliance in the use of JNC VI guidelines for treating hypertensive patients.

Only 10 (27%) of the 37 PCNPs were partially compliant with a score of 7 to 9. This left the majority

of the PCNPs ($n = 27$, 73%) scoring less than 7 and considered noncompliant with the JNC VI recommendation in the management of hypertensive patients. The best total survey score was 9 (10.8% of the sample scores), and the worst total case score was 2 (5.4% of the sample scores). The total distribution of scores can be seen in Figure 1. Since the total average score for the 37 PCNPs in the sample was 5.9 (Range: 2-9, $SD = 1.82$), the researcher determined that nurse practitioners (NPs) are more compliant with the JNC VI guidelines, therefore are not effectively employing them.

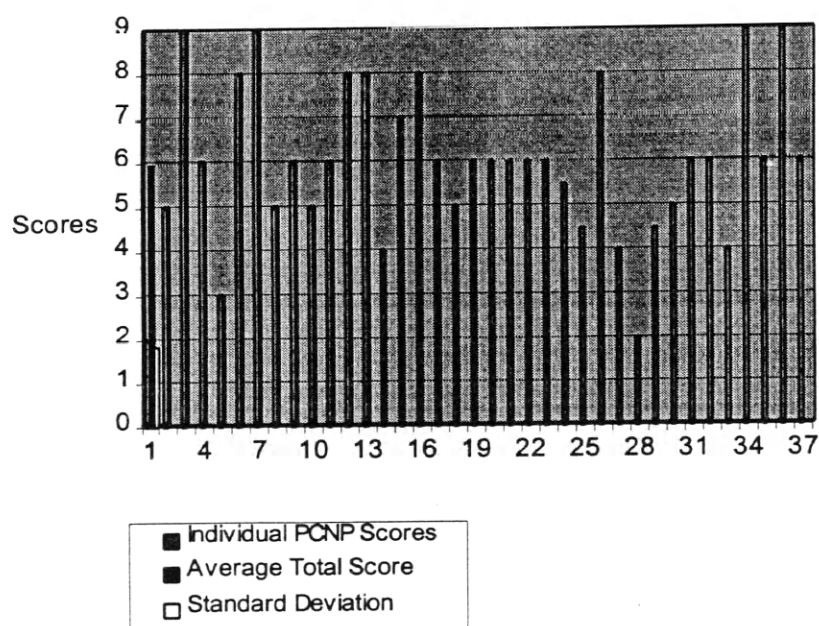


Figure 1. Distribution of scores.

The average total score for PCNPs who worked in a private practice setting and worst clinical site score was 5.6 (Range: 2-9, $\underline{SD} = 1.90$), with only a small number ($\underline{n} = 5$, 20.8%) earning a partially compliant score of 7 to 9. The average total score for the PCNPs in the hospital clinics and best clinical site score was 6.7 (Range: 4-9, $\underline{SD} = 1.7$), with only 4 (40%) of the PCNPs scoring a 7 or higher and being compliant. The rest of the clinical sites of health departments, community clinics, free clinics, and other clinical sites were grouped together due to the small number ($\underline{n} = 6$). These clinical settings had a total average survey score of 5.8 (Range: 5-8, $\underline{SD} = 1.3$), with 2 (33.3%) of the 6 PCNPs scoring a 7 or higher (see Figures 2, 3, and 4).

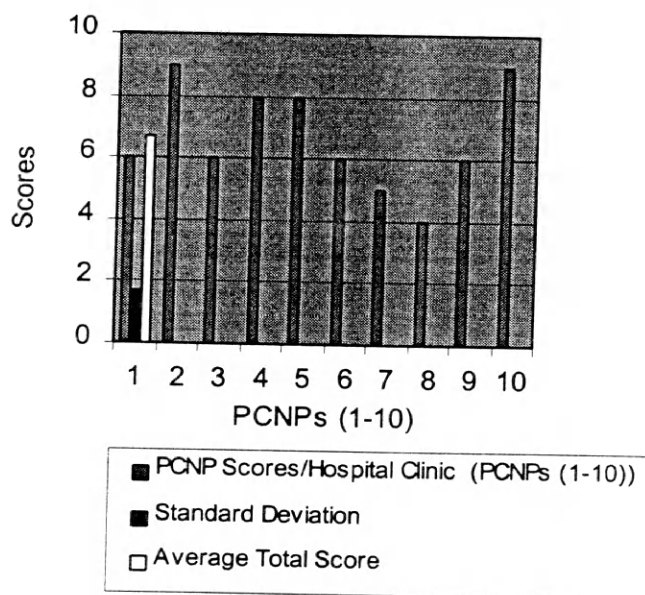


Figure 2. Clinical Sites - Hospital

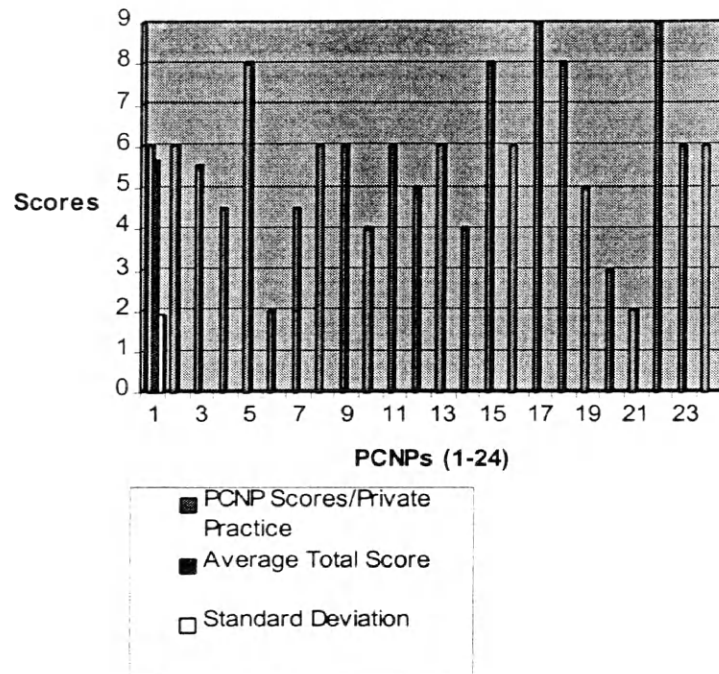


Figure 3. Clinical sites-private practice.

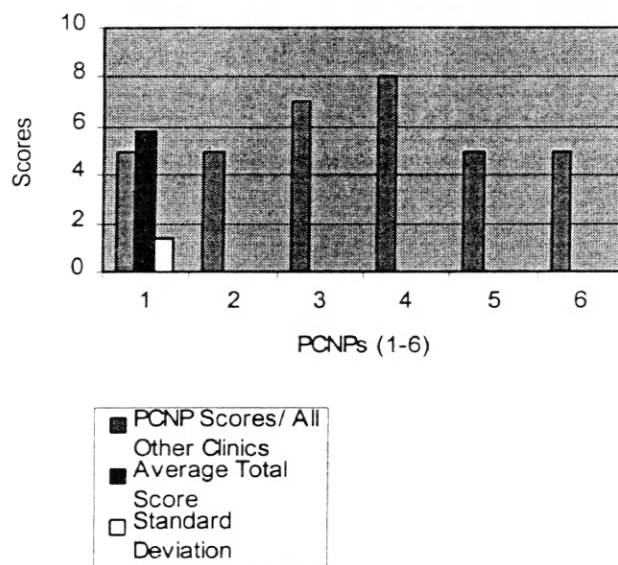


Figure 4. Clinical setting-all other settings.

PCNPs with over 5 years of experience ($\underline{n} = 14$, 38.9%) scored higher than their peers with < 5 years experience ($\underline{n} = 22$, 61.1%) with an average total survey score of 6.9 (Range: 4-9, $\underline{SD} = 1.5$). The less experienced PCNPs with \leq 5 years of experience as an PCNP had a total average survey score of 5.3 (Range: 2-9, $\underline{SD} = 1.8$). The PCNPs with more than 5 years of experience were twice as likely to obtain a score of competence ($\underline{n} = 6$, 42.9%) than their less experienced colleagues ($\underline{n} = 4$, 18.2%).

The best overall average, case study score was obtained in Case Study #1, with a score of 2.4 (Range: 1-3, $\underline{SD} = 0.6$) and 18 (48.6%) of the PCNPs receiving a score of a 3 which was considered to be compliant with the JNC VI guidelines for the case study. The worst overall, average case study score was obtained on Case Study #3, with a score of 1.9 (Range: 0-4, $\underline{SD} = 1.1$). A score of a 4 was needed to be completely compliant with the JNC VI guidelines and a score of a 3 for partial compliance. Only a few ($\underline{n} = 3$, 8.1%) received a score of a 4 and were totally compliant with the JNC VI guidelines chosen to score the case study. Only 8 (21.6%) received a score of 3 and were partially compliant. The second case study also had a high degree of noncompliance with a score of 2 or less ($\underline{n} = 17$, 50%), and the average total score for this

case study was 1.6 (Range: 0-3, SD = 0.9) (see Figures 5, 6, and 7).

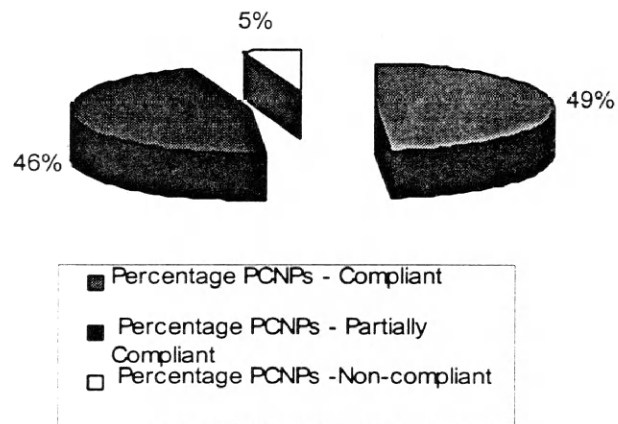


Figure 5. Case study #1.

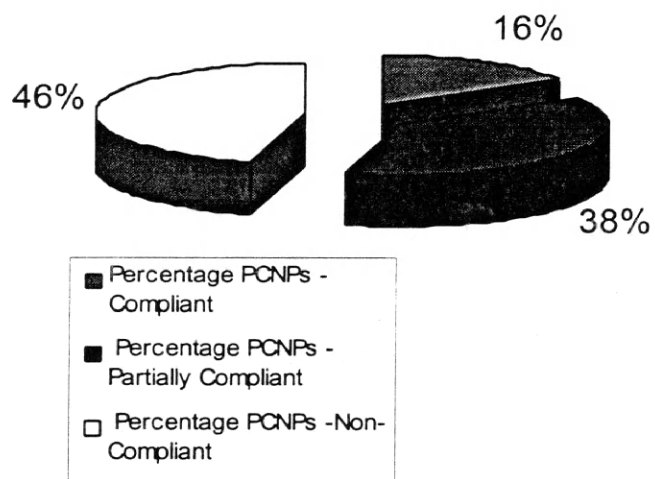


Figure 6. Case study #2.

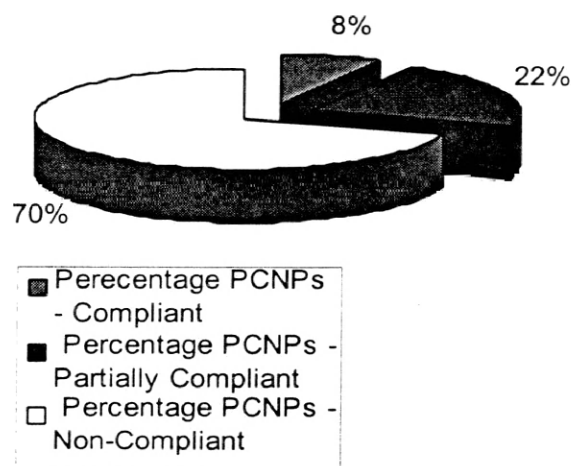


Figure 7. Case study #3.

Only 16 of the PCNPs returned the postcard answering the question of whether or not they were aware of the JNC VI guidelines. Of these, 12 (75%) stated they were aware of these guidelines for hypertension management.

Concerning PCNPs' ability to use the JNC VI guidelines in anti-hypertensive prescriptive practice, 5 (13.9%) and 18 (50%) of the PCNPs were totally compliant or partially compliant with the JNC VI guidelines in the prescription of anti-hypertensive medications, respectively, with a score of a 2 or a 3 out of 3 in this area leaving 13 (36%) of the PCNPs scoring less than a 2 in this area (see Figure 8).

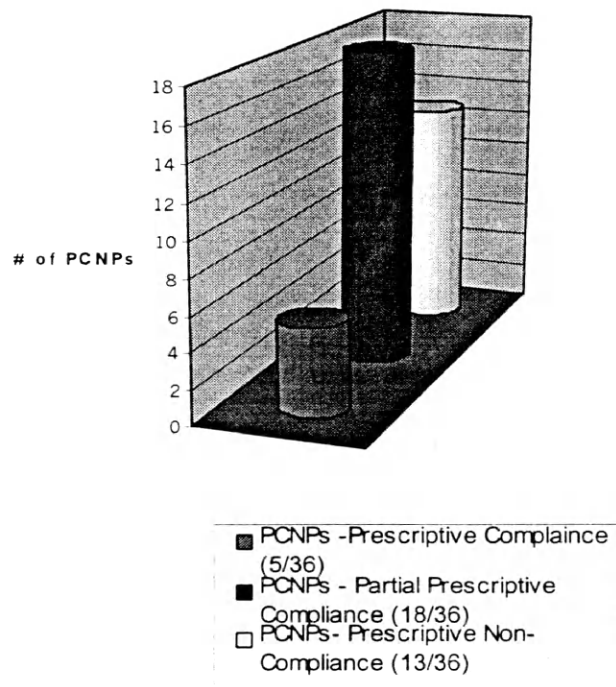


Figure 8. Prescriptive compliance with JNC guidelines.

Chapter V

The Outcomes

This study was interested in assessing how well primary care nurse practitioners (PCNPs) are managing hypertension, as current researchers have indicated that many health care providers have not been successfully managing hypertension at a level to prevent target organ damage over time (Berlowitz et al., 1998; Dustan, 1998; Perry et al., 1998; Swales, 1999). As health care providers, PCNPs are managing hypertension daily, but their compliance to the JNC VI guidelines of hypertension management, as a cohort, had not been studied. This study was performed to add to this lack of research regarding hypertension management by PCNPs.

This researcher sought to answer the two following research questions:

1. How effectively are primary care nurse practitioners (PCNPs) implementing the JNC VI guidelines for hypertension management in practice?
2. Are PCNPs aware of the current national guidelines (JNC VI) for hypertension management?

The Cagle's JNC VI Guidelines Compliance Survey (CJGC Survey) and a question concerning PCNPs' awareness of the JNC VI guidelines were mailed to 200 prospective participants/PCNPs and returned via mail to obtain the data necessary to answer these two research questions.

The sample was composed of family nurse practitioners (FNPs) and adult nurse practitioners (ANPs) with at least one year of experience in hypertension treatment who were certified and licensed in the state of Mississippi, performing the role of a PCNP, in Mississippi, Alabama, Tennessee, or Louisiana. Out of the 200 CJGC Surveys sent to the 200 prospective PCNPs, 54 were returned by PCNPs, of which 37 met the criteria for inclusion in the study.

The majority of the PCNPs (73%) were noncompliant with the JNC VI guidelines in their treatment regimens, although they were aware of these guidelines as recommendations in the treatment of hypertension. The total average score on the CJGC Survey was 5.9 (Range: 2-9, SD = 1.82) out of a possible perfect score of 10. The minimum score for partial compliance on the CJGC Survey was 7 out of 10, with a score of 10 being total compliant. Adherence to the JNC VI guidelines was not due to a lack of knowledge because 75% (N = 12) of the PCNPs (N = 16)

reported that they were aware of this most recent edition of the JNC VI guidelines of hypertension management.

Discussion

The researcher realized that many things influence an PCNP's clinical decision-making skills concerning the treatment of the hypertension patient, which could possibly affect the PCNPS responses on the CJGC Survey toward a score of noncompliance. The survey was not labeled as the CJGC Survey as this would have produced biased responses. The PCNPs were informed that the case studies provided in the survey were being used to assess how PCNPs approach hypertension treatment daily without regard to any insight that their treatment regimens were being reviewed for compliance with the JNC VI guidelines. This approach was crucial to prevent unbiased responses. The researcher was aware that extraneous circumstances could predispose the PCNP to respond to the CJGC Survey in a manner that would produce a score of noncompliance although the PCNP is aware that the JNC VI guidelines exist. These extraneous circumstances are briefly discussed here to aid the reader in an accurate and more meaningful interpretation of data.

The JNC VI guidelines, although scientifically backed and considered to be sound competent management

recommendations in the treatment of hypertension by experts in the field of hypertension management, are just recommendations. They are not laws and are not the sole measures of competent treatment of hypertension, as the clinicians' judgment should be the deciding factor in producing a treatment regimen that is based upon the assessment of all pertinent health data and history as it applies to each individual patient. Saying this, the researcher identified three common extraneous variables that affect PCNPs clinical decision-making skills daily that may have influenced the results of this study.

PCNPs work under protocols for practice in their individualized work settings that reduce the ability of the PCNPs to have completely independent decision making authority over medications and treatment interventions prescribed to patients for the treatment of illness. These protocols are written by health care organizations to simplify and clarify the treatment process for PCNPs to efficiently treat illness in a cost-effective manner while avoiding legal pitfalls. They are approved and mandated by a health care organization's administration to produce this desired effect. Due to these restrictions on independent clinical decision making, many PCNPs habitually treat varying illness by way of protocol. This may have affected the responses of some PCNPs who

responded to Cagle's JNC VI Guidelines Compliance Survey. It can be assumed that some of the PCNPs who completed and returned the CJGC Survey work in settings that impose treatment protocols and may have influenced these PCNPs to respond habitually by protocol rather than treating each case scenario independently with consideration of all treatment options available to an PCNP.

The influence of pharmaceutical sales representatives and preceptor physicians also play a part in the way a PCNP treats hypertensive patients daily. Pharmaceutical sales representatives are constantly providing convincing data from studies they have conducted on the efficacy of their anti-hypertensive medicine and promote those medications under patent heavily. This generally means that they are out to influence PCNPs to prescribe newer agents without longstanding clinical trials rather than the promotion of older agents with many clinical trials that back their efficacy.

Physicians have preferences that affect PCNPs prescribing as they are respected for their medical knowledge and experience in the treatment of hypertension, especially if the PCNP is relatively inexperienced as a clinician and prescribes many of the same medicines as their preceptor to prevent confusion and conflict with the patients they treat together. Siegel and Lopez argued that

many physicians are prescribing newer agents, such as calcium channel blockers and ACE inhibitors, as first-line agents in hypertension treatment rather than the use of beta-blockers and diuretics which have more long-term clinical trial support for their effectiveness (1997). This pattern of prescriptive practice was seen by the PCNPs who answered the CJGC Survey as well, with ACE inhibitors and calcium channel blockers being prescribed more frequently than beta-blockers and diuretics for a stage one essential hypertensive patient (Case #1) when the decision to treat the patient pharmaceutically was chosen. The importance of this finding by the research data cannot be overlooked as it suggests that PCNPs are looking to referred knowledge instead of clinical research as a guide for practice which in the end threatens the professional ability of the PCNP to be an independent practitioner in the treatment of illness and places them in the role of a physician extender, which is not the role of the PCNP.

Lastly, patient compliance affects how PCNPs treat hypertensive patients. Every clinician knows that there is never a perfect treatment regimen, and patient preferences and health beliefs affect outcomes of therapy. Many times clinicians change their prescription practice and treatment regimens due to multiple failures with a

treatment recommendation to produce a desired health change with their patients. This may have been the case in this study as many PCNPs did not treat an essential stage 1 hypertensive patient (Case #1) with lifestyle modifications for a period of 6 months, which was a recommendation of the JNC VI guidelines for such patients. However, an PCNP feels about the success of lifestyle modification factors to lower blood pressure levels, it should be instituted because unneeded anti-hypertensive therapy has side effects and cost that could be avoided. Patients who are started on hypertensive medicines generally also remain on them for life.

It was ironic that many PCNPs in the study initiated treatment of a Stage 1 hypertensive patient with newer, more expensive agents rather than a cheaper diuretic such as hydrochlorothiazide, but many PCNPs would not order and echocardiogram or ECG in the diagnostic labs section of the case studies for the assumed purpose of not placing excessive cost on the patient. One echocardiogram or EKG to warrant the need for a newer more expensive agent is cheaper in the long-run than placing a patient with Medicare or Medicaid on an unneeded, expensive, newer, anti-hypertensive agent. Proper assessment of patients' cardiovascular status is important as well due to the fact that some patients with an MI would benefit from a beta-

blocker as a person with congestive heart failure would benefit from an ACE inhibitor and a diuretic agent or combination. Based upon the findings in this study, PCNPs still need improvement in the area of cost consideration when contemplating the most efficient treatment for a patient.

The current study found that, although more PCNPs were partially or compliant with the JNC VI guidelines used in the CJGC Survey, many were noncompliant, and the largest number of PCNPs having only partial compliance. NPs can use the results of this study to remind them of the importance of following competent, sound prescriptive practice daily to support their ability to treat illness as a primary care provider.

Upon analysis of the data and significant findings, the researcher was cognizant of King's Theory of Goal Attainment as a means of interpreting the data. The researcher found that the theory was appropriate to analyze the results as it dealt with patient treatment by PCNPs to meet a goal of appropriate blood pressure measurements through education and pertinent treatment strategies.

According to King's Theory of Goal Attainment, a nurse is a person with special health care knowledge and skills that can communicate this knowledge to patients

through interactions to mutually set goals to achieve a state of health (King, 1995). The nurse uses specialized knowledge of treatment regimens to help patients choose interventions that will lead to the patient's desired health goals. The patient shares his health beliefs and feelings about various treatment options after weighing the benefits of each intervention and perceived outcome. This exchange of information, as described by King as a transaction, is essential to reach mutual goals which produce satisfaction when obtained (King, 1995). PCNPs are nurses with specialized knowledge to counsel and treat patients with health disturbances such as hypertension. PCNPs must be informed of the most recent scientific knowledge that supports the use of various different anti-hypertensive regimens and their benefit to the patient, as well as competent in the prescribing of treatment regimens that will provide the most benefit to the patient.

Health care providers practice in the information generation where patients are researching the effectiveness of their providers' treatment recommendations with the recommendations of experts in diverse specialties of medicine and will more than likely increase in the future. PCNPs who do not stay up-to-date with the recommendations of expert committees, such as the JNC VI, take the risk of losing trust and the professional

respect of their patients and colleagues. Although the JNC VI guidelines are only recommendations, they are regarded by most health care professionals as the golden standard for hypertension management and should be employed and utilized as much as possible. There will always be cases of extenuating circumstance, but this does not mean that we should "throw the baby out with the bath water." The JNC VI guidelines are sound principles for hypertension treatment and provide legal protection to NPs if utilized in their treatment regimens. If PCNPs fail to share the knowledge of these guidelines with patients, specialized knowledge concerning a health condition is not shared, transactions are threatened, and goals may be unobtained.

Limitations

There were potential limitations to the generalization of the results. The cost incurred by the mailing and reproduction of the CJGC Survey and post card questions limited the researcher to send out only 200 CJGC Surveys and postcards which only yielded 37 PCNPs for the study. Due to the high cost of copies and postage, the JNC VI awareness question on the postcard was sent with the second mailing of the CJGC Survey and could have created insight, therefore biases, into the purpose of the study. However, the surveys that were returned with the postcards

did not have higher scores than those surveys returned without the JNC VI awareness question included.

Another limitation to the study was the lack of biographical data that could have assessed for extraneous variables that could alter the results of the study. The biographical data sheet did not assess for bias that may have been caused by PCNPs working under strict hypertension management protocols, which was mentioned earlier as a possible cause for noncompliant responses. Also, it would have been helpful to have a self-report on how highly PCNPs believed their prescriptive practice habits were affected by preceptor preference or pharmaceutical sales information to rule this out as a possible cause for noncompliance.

Significance to Nursing

Many NPs are currently fighting for the ability to prescribe controlled substances to their patients. The analysis of the data concerning prescriptive practice that was in compliance with the JNC VI guidelines found that more PCNPs ($\underline{n} = 23$) were partially compliant or compliant in the CJGC Survey than those PCNPs ($\underline{n} = 13$) who were not compliant. The majority of these PCNPs were only partially compliant, and there were only three guidelines used for scoring of this compliance. Anti-hypertensive medications

can have serious consequences if not prescribed competently. Hypotension, rebound tachycardia, heart block progression, bradycardia, and dizziness are all possible side effects or adverse effects of anti-hypertensive medications if prescribed carelessly. Controlled substances also can have serious side effects and adverse effects when prescribed incompetently, such as respiratory compromise, overdose, addiction, and an increased susceptibility to accidents and falls. The examination of NPs' prescription of drugs with possible adverse consequences, such as anti-hypertensives, will be examined in the future to assess the NP's ability to prescribe drugs with possible adverse sequela competently and provide competent monitoring of their patients on such medications.

The results of this study should remind NP of the importance of adequately prescribing all medications by respected guidelines of various medical organizations to prevent a lack of trust by patients in the treatment of illness and to avoid legal and legislative pitfalls related to prescriptive practice.

Conclusions

The results of this study implicate that PCNPs are not functioning at a level of compliance in hypertension

treatment consistent with the JNC VI guidelines. This evidenced noncompliance by PCNPs gives support to the need for further, different dissemination techniques of the JNC guidelines for hypertension management in the future. These findings are supported by the study of Goldberg and colleagues, who found that intensive academic detailing programs and continuous quality improvement teams were unsuccessful in producing an overall higher degree of compliance to the JNC guidelines in health care providers in clinical settings (1998). The researcher found that King's Theory of Goal Attainment was appropriate to interpret the findings theoretically as it dealt with the role of the nurse/PCNP as a person with specialized knowledge in health care that must be shared and utilized effectively during patient interactions for goals to be set and obtained.

Recommendations

After extensive review of recent and past literature related to the compliance of health care providers with JNC hypertension management guidelines and the results of this study, the researcher makes the following recommendations to improve the knowledge of hypertension management related to JNC guidelines compliance in the future:

1. Dissemination of future guidelines should incorporate case studies into the education process along with current scientific research to justify the importance of evidenced-based medicine in practice. This approach would be most beneficial in the education programs of health care professionals, such as medical schools and NP programs, so that students have no preconceived or influenced opinion on hypertension treatment, but may be successful in the form of continuing education seminars. This approach also protects providers from feeling threatened by outside influences and would allow open discussion to help the health care provider gain valuable information on the reliability of the JNC guidelines in practice.

2. Replication of the study with a larger sample over a larger geographical area. This will help support or refute the results of this study and provide an analysis of data from which better generalizations can be made.

3. Conduction of research in the future of PCNPs' prescriptive practice and treatment regimens of other health care problems. Further outcomes-based research will point out areas of needed improvement in education and practice, as well as support the role of the PCNP in the treatment of illness.

REFERENCES

References

Belanger, A., Cupples, L. A., & D'Agostino, R. B. (1988). Means at each examination and inter-examination consistency of specified characteristics: 30-year follow-up (National Institutes of Health Document #88-2970). Washington, DC: U.S. Department of Health and Human Services.

Berlowitz, D. R., Ash, A. S., Hickey, E. C., Friedman, R. H., Glickman, M., Kader, B., & Moskowitz, M. A. (1998). Inadequate management of blood pressure in a hypertensive population. New England Journal of Medicine, 339, 1957-1963.

Dustan, H. P. (1998). Current hypertension control is just not good enough. American Family Physician, 58, 1292.

Goldberg, H. I., Wagner, E. H., Fihn, S. D., Martin, D. P., Horowitz, C. R., Christensen, D. B., Cheadle, A. D., Deihl, P., & Simon, G. (1998). A randomized control trial of CQI teams and academic detailing: Can they alter compliance with guidelines? Joint Commission Journal on Quality Improvement, 24, 130-142.

Hansson, L., Zanchetti, A., Carruthers, S. G., Dahlof, B., Elmfeldt, D., Julius, S., Menard, J., Rahn, K. H., Wedel, H., & Westerling, S. (1998). Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: Principal results of the hypertension optimal treatment (HOT) randomized trial: HOT Study Group. Lancet, 351, 1755-1762.

He, J., & Whelton, P. K. (1999). Elevated systolic blood pressure and risk of cardiovascular and renal disease: Overview of evidence from observational epidemiologic studies and randomized controlled trials. American Heart Journal, 138, 211-219.

Izzo, J. L., Levy, D., & Black, H. R. (2000). Clinical advisory statement: Importance of systolic blood pressure in older Americans [On-line]. Available: <http://www.nhlbi.gov>

Kennel, W. B. (1999). Historic perspectives on the relative contributions of diastolic and systolic blood pressure elevation to cardiovascular risk profile. American Heart Journal, 138, 205-210.

King, I. M. (1981). A theory for nursing: Systems, concepts, process. New York: John Wiley & Sons.

King, I. M. (1995). The theory of goal attainment. Advancing King's systems framework and theory of nursing. In M. A. Frey & C. L. Seiloff (Eds.) (pp. 14-22). Thousand Oaks, CA: Sage.

Lloyd-Jones, D. M. (1999). Impact of systolic versus diastolic blood pressure level of JNC-VI blood pressure stage classification. Hypertension, 34, 381-385.

Morgenson, C. E. (2000). Randomized control trial of dual blockage of renin-angiotensin system in patients with hypertension, microalbuminuria, and non-insulin dependent diabetes: The candesarta and lisinopril trial. British Medical Journal, 321, 1440-1441.

National Center for Health Statistics. (1998). Fastats A to Z: Heart disease [On-line]. Available: <http://www.nchs/fastats/heartdisease>

National Heart, Lung and Blood Institute. (1997). The sixth report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment. Archives of Internal Medicine, 157, 2413-2446.

Pearson, L. (2001). Annual legislative update: How each state stands on legislative issues affecting advanced nursing practice. Nurse Practitioner, 26, 7-57.

Penman, A. D., & Johnson, D. (2000). 2000 Mississippi stroke report. Jackson, MS: Mississippi State Department of Health and the American Heart Association.

Perry, H. M., Jr., Bingham, S., Horney, A., Rutan, G., Mohinder, S., Carmody, S., & Collins, Jr. (1998). Antihypertensive efficacy of treatment regimens used in Veterans Administration hypertension clinics. Hypertension, 31, 771-779.

Polit, D. F., & Hungler, B. P. (1999). Nursing research: Principles and methods (6th ed.). Philadelphia: Lippincott.

Psaty, B. M., Smith, N. L., Siscovick, D. S., Koepsell, T. D., Weiss, N. S., Heckbert, S. R., Lemaitre,

R. N., Wagner, E. H., & Furberg, C. D. (1997). Health outcomes associated with antihypertensive therapies used as first-line agents: A systematic review and meta-analysis. Journal of the American Medical Association, 277, 739-745.

Siegel, D., & Lopez, J. (1997). Trends in antihypertensive drugs in the United States: Do the JNC V recommendations affect prescribing? Journal of the American Medical Association, 278, 1745-1748.

Staessen, J. A., Gasowski, J., Wang, J. G., Thijs, L., Hond, E. D., Boissel, J., Coope, Jr., Ekblom, T., Guyffier, F., Liu, L., Kerlikowske, K., Pocock, S., & Fagard, R. H. (2000). Risks of untreated and treated isolated hypertension in the elderly: Meta-analysis of outcome trials. Lancet, 355, 865-873.

Stamler, J., Stamler, R., & Neaton, J. D. (1993). Blood pressure, systolic and diastolic and cardiovascular risks. Archives of Internal Medicine, 153, 598-612.

Swales, J. D. (1999). Current clinical practice in hypertension: The EISBERG project. American Heart Journal, 138, S231-S237.

Tomey, A. M., & Alligood, M. R. (1998). Nursing theorists and their work. St. Louis, MO: Mosby.

APPENDIX A
CAGLE'S JNC VI GUIDELINES
COMPLIANCE SURVEY

Cagle's JNC VI Guidelines
Compliance Survey

The following case studies were designed to assess the primary care nurse practitioners' management strategies related to hypertension. The information you provide is very important for recommendations in treatment of this "silent killer" and appreciated very much. Following the case studies, three categories of interventions will need to be completed: pharmacologic interventions, non-pharmacologic interventions, and diagnostic tests. The pharmacologic and non-pharmacologic interventions will need to be handwritten (please be as detailed as possible). The diagnostic test portion can be checked for each test that you would order in each situation.

Thank you for your time and participation in this study. Please fill in personal information before starting as it is crucial to how your responses will be analyzed in the study.

Personal Data

What is your practice site?

- ☐ a. Hospital clinic
- ☐ b. Free clinic
- ☐ c. Health Department
- ☐ d. Private practice

Years of experience as a nurse practitioner: _____

Your nurse practitioner specialty:

- ☐ a. Family nurse practitioner
- ☐ b. Adult nurse practitioner

Type of educational program attended:

- ☐ a. Certificate
- ☐ b. Master's

Average number of patients with hypertension you see a day: _____

CASE STUDIES START ON NEXT PAGE.

Case #1

Mr. R., a 36 yr. old Caucasian male, who is slightly overweight, presented to the clinic 2 weeks ago for an insurance physical. He had an elevated B/P of 160/78, Body Mass Index (BMI) of 28, (BMI 25-29 is Overweight) and no other abnormal findings. He had no previous history of hypertension. His B/P was checked again one week later and was 156/80. Mr. R. came in today with a B/P reading of 154/88. He was hospitalized for a DVT at the age of 32 yrs. Mr. R. works as a contractor for a local real estate firm and states he is "under stress lately" due to the number of projects he is undertaking. Mr. R confirms use of oral tobacco products, one can a week, and poor diet due to being "on the run." Father has HTN. Grandfather on mother's side died at the age of 58 yrs of MI. KNDA. No Hx of surgeries or chronic illness. How would you treat this pt.?

PHARMACOLOGIC INTERVENTIONS:**NON-PHARMACOLOGIC INTERVENTIONS:****DIAGNOSTIC TESTS/LAB:**

Urinalysis: _____ CBC: _____
 Fasting glucose: _____ Lipid Profile: _____ TSH: _____
 Echocardiography: _____
 24-hour urinary protein/creatinine clearance: _____
 Electrolytes: _____ EKG: _____
 Other. Please specify and give rationale: _____

Case #2:

A 52 yr. old Hispanic female with a Hx of COPD and GERD presented to your clinic yesterday for her annual GYN exam, B/P was 178/80, HR 80. Pt. was informed to return to clinic tomorrow to recheck B/P. On return visit pt. C/O of H/A with B/P OF 198/74, HR 78. Pt. took B/P last night at home while resting 168/78. Pt. is on Medicaid. Her granddaughter lives with her, and she helps raise three small grandchildren. NKDA, immunizations are up-to-date, No surgeries. She was Dx with atypical chest pain 3 yrs. ago. A stress test was done then and was "normal." She also had an ECHO and EKG and pt said that MD said that "left side of my heart is slightly enlarged." She was Dx with GERD 3 yrs ago and takes Prilosec 20 mg QD. She has had no chest pain since then. B/P has been treated for the past 6 yrs by taking HCTZ 25 mg QD. She denies SOB at rest but has periods of SOB with exertion and no chest pain since she started Prilosec 3 years ago. She has no history of vision problems or changes in vision. No tobacco or alcohol use. How would you treat this pt?

PHARMACOLOGIC INTERVENTIONS:**NON-PHARMACOLOGIC INTERVENTIONS:****DIAGNOSTIC TESTS/LAB:**

Urinalysis: _____ CBC: _____
 Fasting glucose: _____ Lipid Profile: _____ TSH: _____
 Echocardiography: _____
 24-hour urinary protein/creatinine clearance: _____
 Electrolytes: _____ EKG: _____
 Other. Please specify and give rationale: _____

Case #3:

Mr. G. a 45 yr. old African American male with a Hx of Type 1 DM and HTN, presents to the clinic on a Monday with c/o weakness, and polyuria. He states his B/P medication is "messing up his love life." B/P is 174/92 mmHg. He smokes one pack of cigarettes daily, and drinks a 6 pack of beer on Friday and Saturday weekly. His father died of a stroke at the age of 60 yrs. His mother is alive but has a Hx of chronic renal failure, HTN, and Type 1 DM. He is currently taking Prinivil 10 mg BID but stopped 3 days ago due to the side-effects. The patient has worked in construction for 20 years and has medical insurance and a medicine card to cover prescriptions. Mr. G. is on NPH insulin 40 units in a.m. and 20 units PM. Pt states FSBS is "up and down." How would you treat this pt?

PHARMACOLOGIC INTERVENTIONS:**NON-PHARMACOLOGIC INTERVENTIONS:****DIAGNOSTIC TESTS/LAB:**

Urinalysis: _____ CBC: _____
Fasting glucose: _____ Lipid Profile: _____ TSH: _____
Echocardiography: _____
24-hour urinary protein/creatinine clearance: _____
Electrolytes: _____ EKG: _____
Other. Please specify and give rationale: _____

APPENDIX B

APPROVAL OF MISSISSIPPI UNIVERSITY FOR
WOMEN'S COMMITTEE ON USE OF HUMAN
SUBJECTS IN EXPERIMENTATION



MISSISSIPPI
UNIVERSITY
FOR WOMEN

Admitting Men Since 1982

Office of the Vice President for Academic Affairs
Eudora Welby Hall
W-Box 1603
Columbus, MS 39701
(662) 329-7142
(662) 329-7141 Fax

www.muw.edu

February 23, 2001

Mr. Gregory N. Cagle
c/o Division of Nursing
P. O. Box W-910
Campus

Dear Mr. Cagle

I am pleased to inform you that the members of the Committee on Human Subjects in Experimentation have approved your proposed research as submitted.

I wish you much success in your research.

Sincerely,

Vagn K. Hansen, Ph.D.
Vice President
for Academic Affairs

VH:wr

cc: Mr. Jim Davidson
Dr. Mary Pat Curtis

Where Excellence is a Tradition

APPENDIX C
LETTER TO PARTICIPANTS

407 Aquarius Drive SW
Hartselle, AL 35437
(256) 773-2165
E-mail: Gerrgfnp@AOL.com
Static777@AOL.COM

Dear Prospective Participant:

I am writing this letter to gather participants for my graduate research project on hypertension at the Mississippi University for Women. The study is focused on assessing family nurse practitioners' hypertension management strategies to ascertain how this "silent killer" is approached from both a nursing/caring modality and the medical/curing modality in practice. The results will be examined using King's Goal Attainment Theory and will be disseminated back to participants, at their discretion, following the completion of the study. An attached questionnaire using vignettes is included with instructions. This questionnaire will assess the family nurse practitioner in hypertension management practice in three areas: pharmacological, non-pharmacological, and diagnostic tests ordered. All information gathered from the study will be kept confidential and used only for the purpose of this study.

If you consent to participate, please fill out the questionnaire and return it in the pre-addressed, stamped envelope which has been provided. Please **do not include your name or address on the envelope** to ensure confidentiality. Your informed consent to participate in the study will be implied with the return of the questionnaire. You will be able to withdraw from the study at any time, although any data already provided cannot be removed from the study due to its anonymous nature.

Thank you for your time and consideration. If you have any questions concerning the study, please contact me by telephone, mail, or E-mail.

Sincerely,

Gregory N. Cagle, RN
MUW FNP Student

APPENDIX D

SECOND CONSENT LETTER AND REQUEST
FOR PARTICIPATION

407 Aquarius Drive SW
Hartselle, AL 35437
(256) 773-2165
E-mail: Gerrgfnp@AOL.com
Static777@AOL.COM

Dear Prospective Participant:

If you have already sent back the vignettes I sent as part of my research study, thank you for your participation. This research, as I explained in my previous letter, is part of my graduate program requirements at the Mississippi University for Women. Data you provided are greatly appreciated. Data should be analyzed soon along with the results. If you would like a copy of the results, E-mail me at the address above, and I will gladly send you the results of the study. For those who have not been able to send the vignettes back, I am writing you to remind you of the research study on hypertension that I am conducting as part of my graduate program at Mississippi University for Women. I am writing again to each prospective participant to ask for their participation in this study. If you think you can help, please send the questionnaire back by the end of the month. I have enclosed another questionnaire and a self-addressed, stamped envelope. Here is a brief description of the study again to help with your decision.

The study is focused on assessing primary care nurse practitioners' hypertension management strategies to ascertain how this "silent killer" is approached from both a nursing/caring modality and the medical/curing modality in practice. The results will be examined using King's Goal Attainment Theory and will be disseminated to participants, at their discretion, following the completion of the study.

All information gathered from the study will be kept confidential and used only for the purpose of this study. Please **do not include your name or address on the envelope** to ensure confidentiality. Your consent to participate in the study will be implied with the return of the questionnaire. You will be able to withdraw from the study at any time, although any data already provided cannot be removed from the study due to its anonymous nature. I have one more request as part of the study. I am asking one qualitative question in the study to help explain the results obtained from the vignettes provided to each PCNP included in the study. The question is a postcard included with this letter and can be returned with the questionnaire or by itself in the self-addressed, stamped envelope provided. Your help with this part of the study will also be greatly appreciated as it is an essential part of the study for its completion. Once again, thank you for your time

and help in this study. I thank you for your time and consideration. If you have any questions concerning the study, please contact me by phone, mail, or E-mail.

Sincerely,

Gregory N. Cagle, RN
MUW FNP Student

APPENDIX E

JNC VI AWARENESS QUESTION/POSTCARD

Please answer and return the following research question:

Are you aware of the current national guidelines (The Sixth Report of The Joint National Committee on the Prediction, Detection, Evaluation, and Treatment of High Blood Pressure) for hypertension management?

Yes: 0

No: 0

(Fill in oval with black ink pen, please)